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1 Introduction

1.1 Overview

Overview



DVDLogic IGEitor contains all necessary means for creating and editing interactive menus of Blu-ray discs. Work with IGEitor is handy, visually easy to use and quick. IGEitor allows you to create interactive menus with basic functionality to complex compliant menus all by adhering to the BD BD specification. IGEitor contains special functions for any graphic image adaptation, palette recalculation, navigation commands writing, opening and editing existing menus. Menu's created by IGEitor can be immediately be opened and muxed in Sonic Scenarist BD.

1.2 Features

Features

- **Import previously compiled and demuxed IES stream file (*.ies)** - IGEitor can import or export any existing IES file, regardless of where it was created or even how it was demuxed. After the import, you can change and/or add any menu elements, including buttons, effects, commands or the whole page.
- **Import and export Sonic Scenarist Designer file (*.designer)** - Using the IGEitor, you do not need to restrict yourself to opening IES files you can also use an already existing template of menu from Scenarist Designer.
- **Using *.PNG, *.BMP or *.JPG images for buttons** - The creation of buttons for your menu, you can use several image formats. Any image will be re-coded and converted into internal format used in interactive menu.
- **Export IES into Sonic Scenarist BD project file** - If you created a difficult menu or used unique features in your navigation commands programming; in some cases Scenarist cannot load such menus manually. For these cases IGEitor has function to create Sonic Scenarist project file with automatically inserted menu.
- **Checking correctness of the IES file** - the program allows you to check correctness of IES files to conform to BD specification. Also user can fix anything manually in case of error.
- **Editor of audio in the buttons for sound.bdmv file** - pressing on interactive menu button for sound, allows you to manage sounds effects for buttons, opens the special editor of "sound.bdmv" file. The Sound Editor does not affect the already existent structure, thus user can anytime add new sounds.
- **Import and export buttons images** - IGEitor allows to save interactive menu buttons images into file. And you can also change image on any menu button by using "import image" function. This is useful, for example, if needed to change graphic image on menu button.
- **Palette calculation for new images** - after adding new menu button image the program can recalculate palette using algorithm of color optimization. This algorithm will select colors that are closest to the original image colors.
- **Visualization of Buttons in Menu Page for every state** - user can see how menu will look for all three button states (normal, active, selected).
- **Navigation commands editor with syntax highlight** - while programming of buttons behaviour using navigation commands, editor will highlight special commands name and parameters with different colors. This allows you to reduce the possibility to make error during navigation commands writing.
- **Background image insertion for better Page visualization** - this function helps for better setting of buttons positions in design time. This also helps you to see how your design will look in the finished interactive menu.
- **Step by step Interactive Menu construction very close to BD specification** - IGEitor

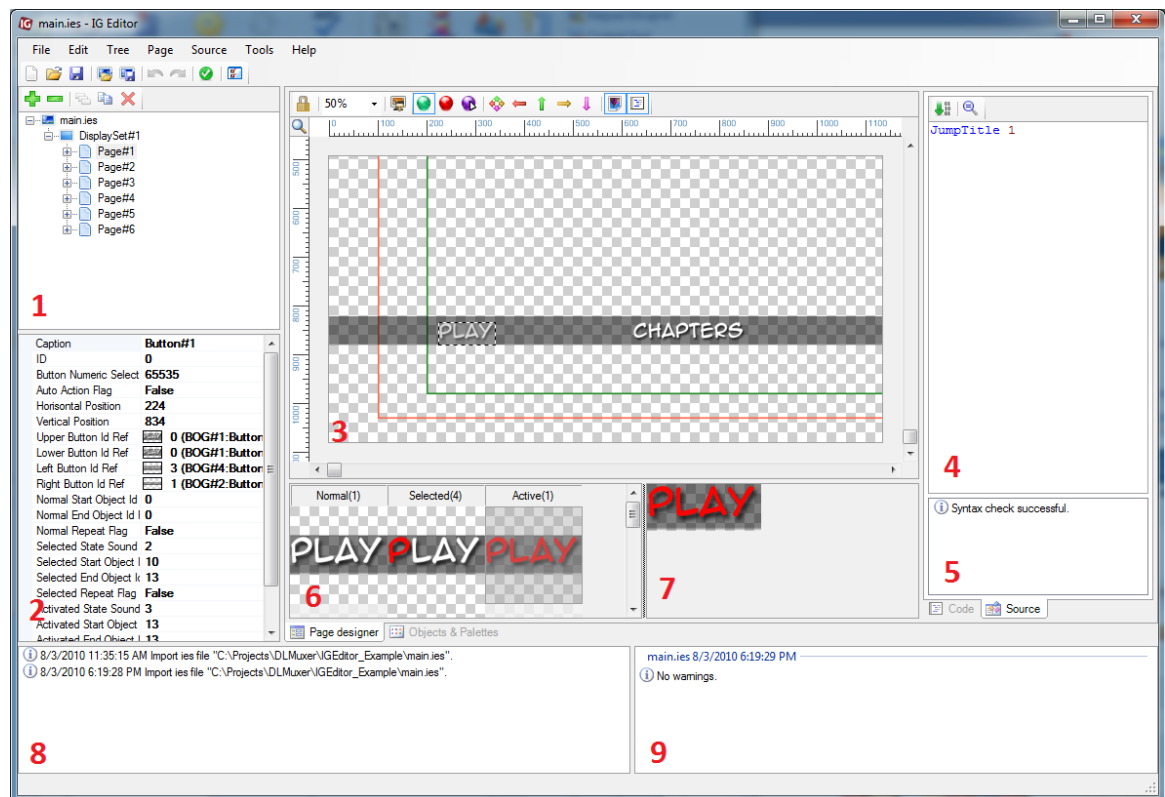
constructs menu in part that are strictly defined in the Blu-ray Disc specification. That is why, the program can use any user that is familiar with BD specification. From another hand this helps to avoid the errors and incompatibility while menu construction.

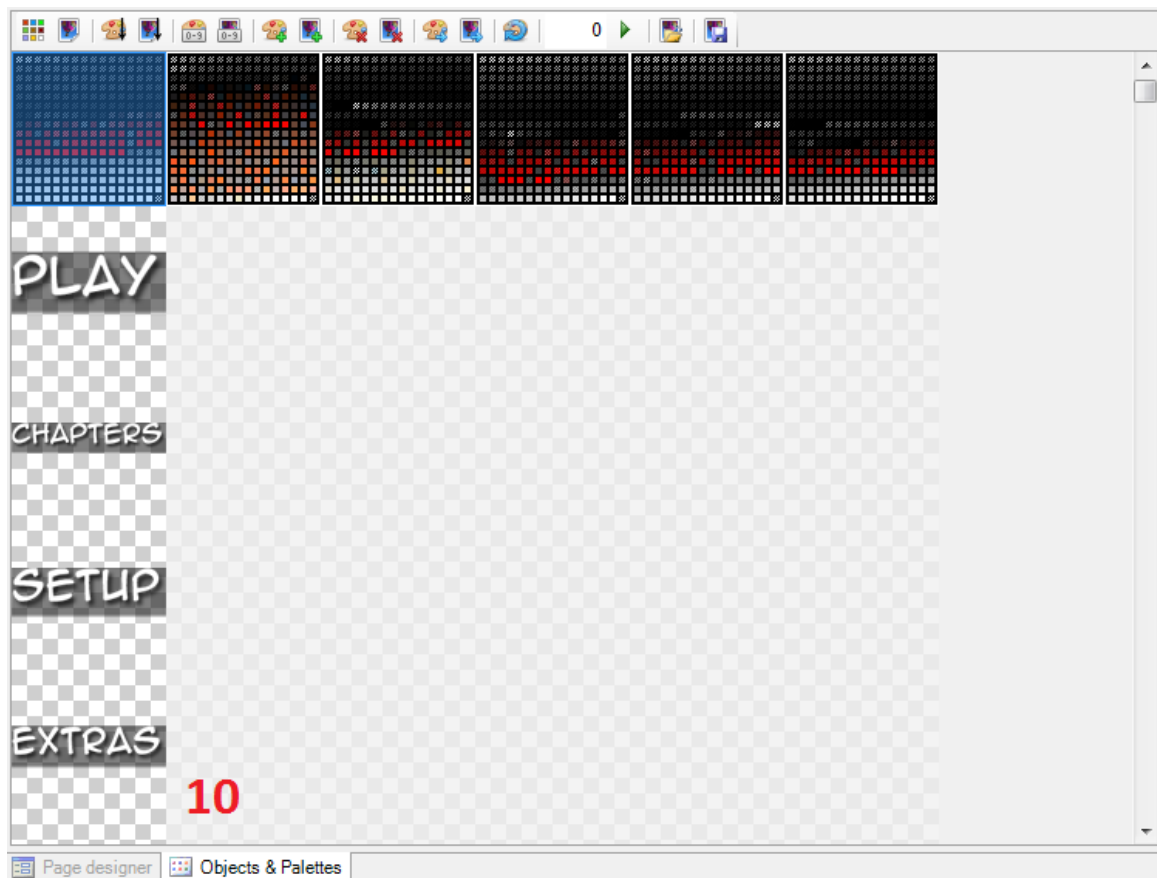
2 Using Interactive Menu Editor

2.1 User Interface

User Interface

IGEditor's User Interface is divided on several separated elements that allows the user to quickly and comfortably enter all data during Interactive Menu construction.





1. Project Explorer Tree - this panel shows all Interactive Menu elements in view that is very close to BD specification. Selection of separate element in the Tree will show element's properties in PropertyEditor.

2. PropertyEditor - list of properties, fields and values. You can set appropriate field value manually or via drop down variants (if applied). To see the properties list select appropriate element in Project Explorer Tree or in Page Designer.

3. Page Designer - panel located in the center of Main window. This Panel can show all buttons for all possible states in Interactive Menu. You can also move buttons with mouse here. Page Designer can show how finished Interactive Menu will look.

4. Source Panel - handy interface element that allows to enter, edit and compile navigation commands. Commands syntax are highlighted, so user can see if command and parameters are correct.

5. Source code Log - Log shows messages from navigation commands compiler.

6. Button's states panel - you can see all images for all 3 button's states (normal, active and selected) here.

7. State Image - shows currently selected image from Button's States panel.

8. IGEitor Log - main log of IGEitor. Will show all important messages.

9. Compilation Log - log show Interactive Menu compilation messages.

10. Objects and Palettes - list of all Palettes and Objects. The List is well structured and all Objects are shown according to appropriate Palette.

2.2 ToolBars functions

ToolBars functions

The toolbars provide buttons to access some of the frequently used commands of a menu. To activate the command, you can click its toolbar button. If the command is unavailable, its button appears greyed out.

Note: Place the mouse cursor over a toolbar button to see the tooltip describing its use.

2.2.1 Common Toolbar

Common Toolbar



	New Project	Creates a new IGEitor project.
	Open Project	Show the Open File dialog to open exist IGEitor project.
	Save Project	Saves the edited content as IGEitor project.
	Import IES File	Show the Open File dialog to open exist IES file.
	Export IES File	Saves the edited content as IES file.
	Undo	The Undo operation reverts edited content to its state before the last edited change has been made. Multiple levels of Undo are available.
	Redo	The Redo operation reverts the edited content to its state before the last Undo has been performed. Redo can only be performed after an undo (or after a series of undos).
	Check	Checks edited content for errors.
	Options...	Show the Options Dialog.

2.2.2 Project Explorer Tree Toolbar

Project Explorer Tree Toolbar



	Expand all	Expands all the tree nodes.
	Collapse all	Collapses all the tree nodes.
	Copy	Copies current node content to clipboard.
	Paste	Pastes current clipboard content as tree subnode.
	Delete	Deletes current tree node.
	Add DisplaySet	Adds new display set as tree subnode.
	Add Page	Adds new page as tree subnode.
	Add BOG	Adds new button overlapped group as tree subnode.
	Add Button	Adds new button as tree subnode.
	Add Window	Adds new effect window as tree subnode.
	Add Effect	Adds new effect as tree subnode.
	Add CompositionObject	Adds new composition object as tree subnode.

2.2.3 Page Designer Toolbar

Page Disgner Toolbar



	Lock	Locks all the buttons of the page editor for moving the mouse or keyboard.
	Show background image	Shows background image if it has been set up as the property of "Background Image" or the current "Display Set" .
	Normal	Displays all buttons as first image of normal sequence of the objects.
	Active	Displays all buttons as first image of active sequence of the objects.
	Selected	Displays all buttons as first image of selected sequence of the objects.
	Show arrows	Displays the arrows.
	Show left arrows	Displays the left arrow (if Show arrows has been checked)
	Show upper arrows	Displays the upward arrow (if Show arrows has been checked)
	Show right arrows	Displays the right arrow (if Show arrows has been checked)
	Show lowers arrows	Displays the downward arrow (if Show arrows has been checked)
	Show objects panel	Displays the objects panel, that lists all objects attached to the button.
	Show code panel	Displays the code panel, that is the source code, attached to the button.

2.2.4 Source Code Panel Toolbar

Source Code Panel Toolbar



	Compile	Compiles the code in the editor and, if it's done successful then attach it's to the button.
	Compare Code	Compares edited code with attached one to the button

2.2.5 Objects and Palettes Editor Toolbar

Objects and Palettes Editor Toolbar

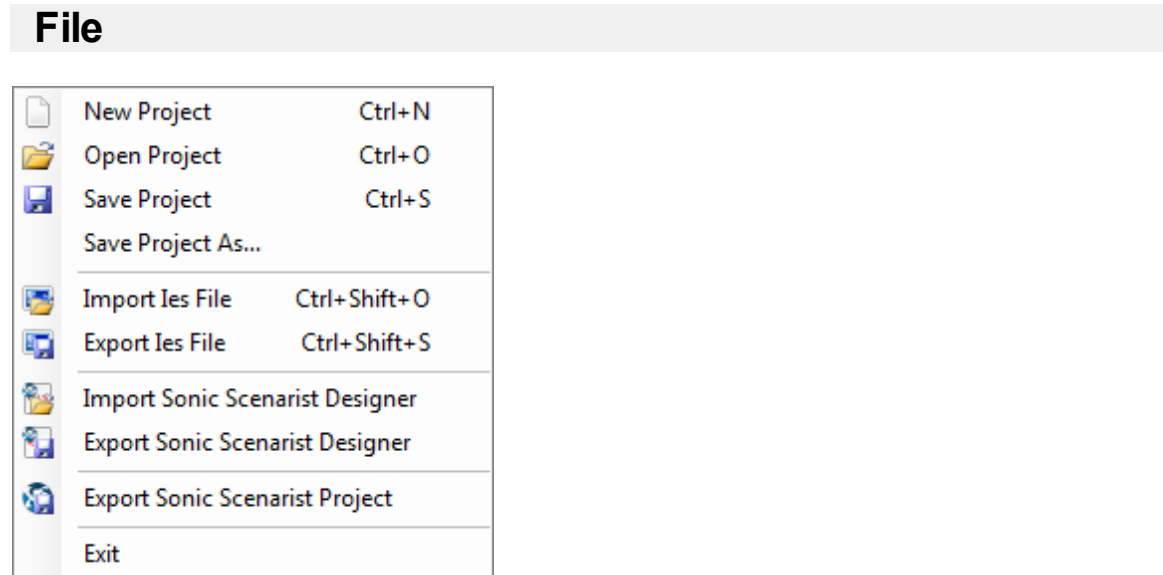


	Show all combinations	Shows all combinations of objects and palettes if it has been checked. Otherwise, displays only those combinations that are somewhere involved.
	Show Original	Displays 32-bit images, attached to the objects if it has been checked. Otherwise, displays objects of the current palette.
	Sort Palettes by ID	Palettes are displayed in the order in which they have been located of the original source. This order doesn't always coincide with the order of growth of Id. Command Sort Palettes by ID rearranges palettes in ascending order of PalettID property value according current display set.
	Sort Objects by ID	Objects are displayed in the order in which they have been located of the original source. This order does not always coincide with the order of growth of Id. Sort Objects by ID command rearranges objects in ascending order of ObjectID property value according current display set.
	Recalculate Palettes ID	Renumbers PalettID property values for getting appropriate values differ by one. The value will be changed in all places using these palettes.
	Recalculate Objects ID	Renumbers ObjectID property values for getting appropriate values differ by one. The value will be changed in all places using these objects.
	Add Palette	Adds new palette. By default, the palette is grayscale. Late you can change this palette with command Recalculate Palette .
	Add Object	Adds new empty object with dimension 8x8 (minimal allowed dimension to object). Late you can change this object with command Import object .
	Remove Palette	Deletes current palette. If the palette somewhere in use, brings up a message box with resubmitted for removal.
	Remove Object	Deletes current object. If the object somewhere in use, brings up a message box with resubmitted for removal.
	Insert Palette	Inserts new grayscale palette before currently selected palette. If Paletteld is less than the current no busy one, assigns this Id to Paletteld of this new palette. Otherwise, assigns the current Id of the new palette and renumbers the rest of the palettes for avoiding collisions.

	Insert Object	Inserts new empty object before the currently selected object. If ObjectId is less than the current no busy one, assigns this Id to ObjectId of this new object. Otherwise, assigns the current Id of the new object and rennumbers the rest of the objects for avoiding collisions. This command firstly need for inserting new frames in existent animation sequences.
	Recalculate Palette	Recalculates palette related to the currently selected column based on 32-bit pictures, assigned to the objects involved anywhere in conjunction with this palette. Also converts these objects. If the same object is used in conjunction with this and any other palette, then there is a collision: after changing object in conjunction with this palette, he is distorted in conjunction with other palettes. Therefore, when you encounter this situation a dialog is shown (if it is not disabled in the options) to select the one of two options - to share at the same time used objects without changing the rest of the palette (number of objects increase and, consequently, increase the size of file), or recalculate the associated palettes too.
	Import object	Opens the picture file and pastes it instead of the current object, tentatively bringing to the current palette. It also retains the original 32-bit image that you can see if the button Show Original has been checked. If this object is the same as used in conjunction with other palettes, it is shown a dialog (if it is not disabled in the options) to select the one option - to divide the current object, thereby its copy will be used only in conjunction with palette of related to this column, and original object - of all other palettes, and it will be substituted a picture for him, or to change the picture for all combinations of the current object and palettes.
	Export object	Saves the image bundle of the current object and palette of the png-file. Thus if Show Original is checked, 32-bit image, attachments to current objects, will be saved.

2.3 Main Menu

2.3.1 File



New Project - creates new IGEitor project. Project will be empty. Project file will be saved in XML format.

Open Project - show the Open File dialog to open existed IGEitor project.

Save Project - saves the edited content as IGEitor project.

Save Project As... - saves the edited content as IGEitor project with new name.

Import Ies File - show the Open File dialog to open existed Ies file.

Export Ies File - saves the edited content as Ies file.

Import Sonic Scenarist Designer - open Scenarist Designer files (*.designer) in IGEitor.

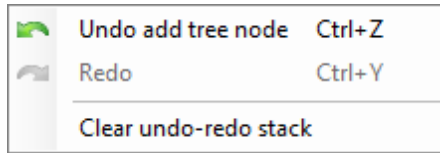
Export Sonic Scenarist Designer - save IGEitor's content as Scenarist Designer (*.designer) file.

Export Sonic Scenarist Project - create Sonic Scenarist project file with automatically inserted menu.

Exit - close the program.

2.3.2 Edit

Edit



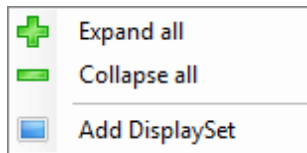
Undo - The Undo operation reverts edited content to its state before the last edited change has been made. Multiple levels of Undo are available.

Redo - The Redo operation reverts the edited content to its state before the last Undo has been performed. Redo can only be performed after an undo (or after a series of undos).

Clear undo-redo stack - erase sequence of done operations for Redo and Undo functions.

2.3.3 Tree

Tree



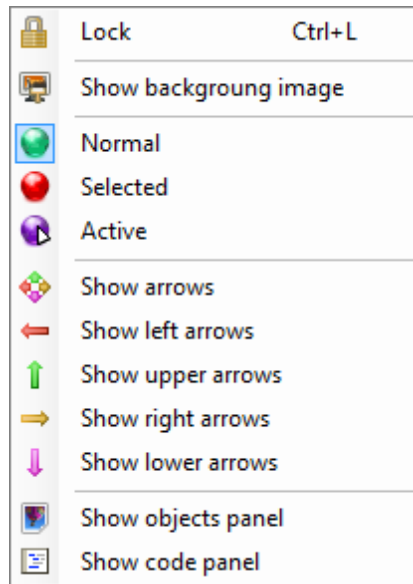
Expand all - expand all elements in Project Explorer Tree

Collapse all - close all elements in Project Explorer Tree

Add DisplaySet - add new DisplaySet element to project.

2.3.4 Page

Page



Lock - locks all the buttons of the page editor for moving the mouse or keyboard.

Show background image - shows background image if it has been set up as the property of "Background Image" or the current "Display Set" .

Normal - displays all buttons as first image of normal sequence of the objects.

Selected - displays all buttons as first image of selected sequence of the objects.

Active - displays all buttons as first image of active sequence of the objects.

Show arrows - displays the arrows.

Show left arrows - displays the left arrow (if **Show arrows** has been checked)

Show upper arrows - displays the upward arrow (if **Show arrows** has been checked)

Show right arrows - displays the right arrow (if **Show arrows** has been checked)

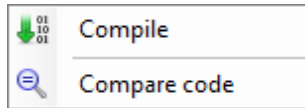
Show lower arrows - displays the downward arrow (if **Show arrows** has been checked)

Show objects panel - displays the objects panel, that lists all objects attached to the button.

Show code panel - displays the code panel, that is the source code, attached to the button.

2.3.5 Source

Source

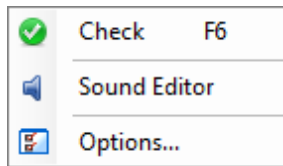


Compile - compiles the code in the editor and, if it's done successful then attach its to the button.

Compare code - compares edited code with attached one to the button.

2.3.6 Tools

Tools



Check - checks edited content for errors.

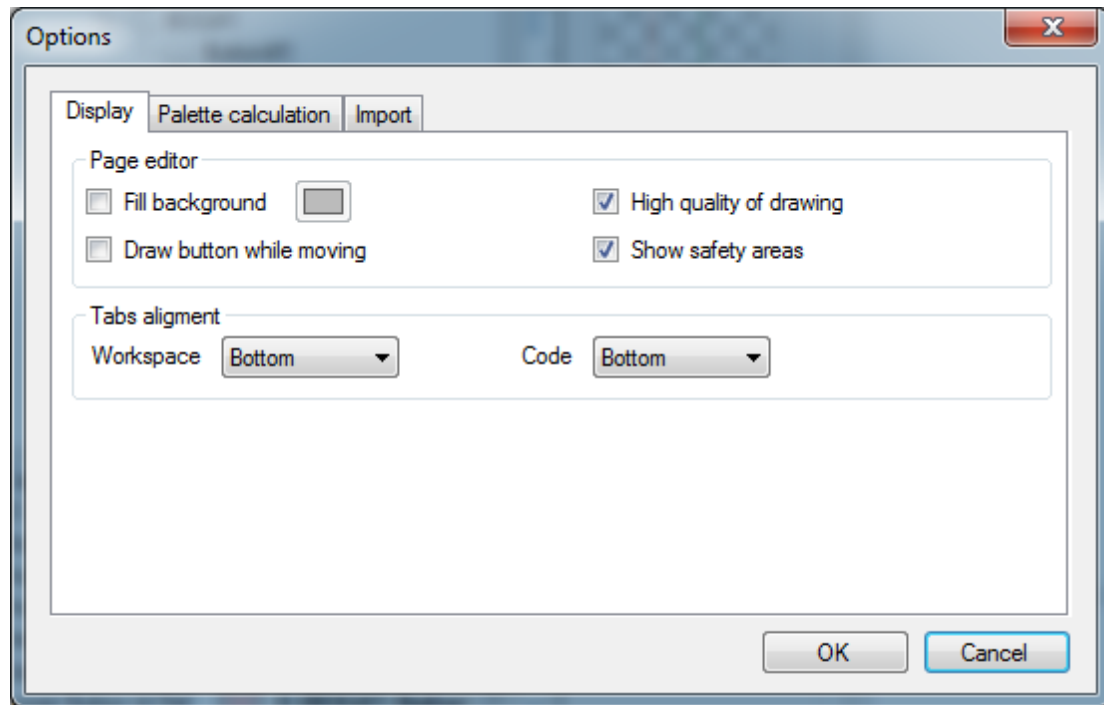
Sound Editor - run special tool for creation and editing menu buttons sound file "sound.bdmv".

Options... - show the Options Dialog.

2.4 Options

2.4.1 Display

Display



Fill background - fill background in Page Designer with specified color. Useful when you want to make more contrast background for separate buttons for better visualization.

Draw button while moving - redraw full button every time when you move button over Page Designer. This can take some time and PC resources and also can make button moving slow. We advice disable this options for better speed.

High quality of drawing - show every pixel for menu buttons in design time for Page Designer panel. May make working in Page Designer slow.

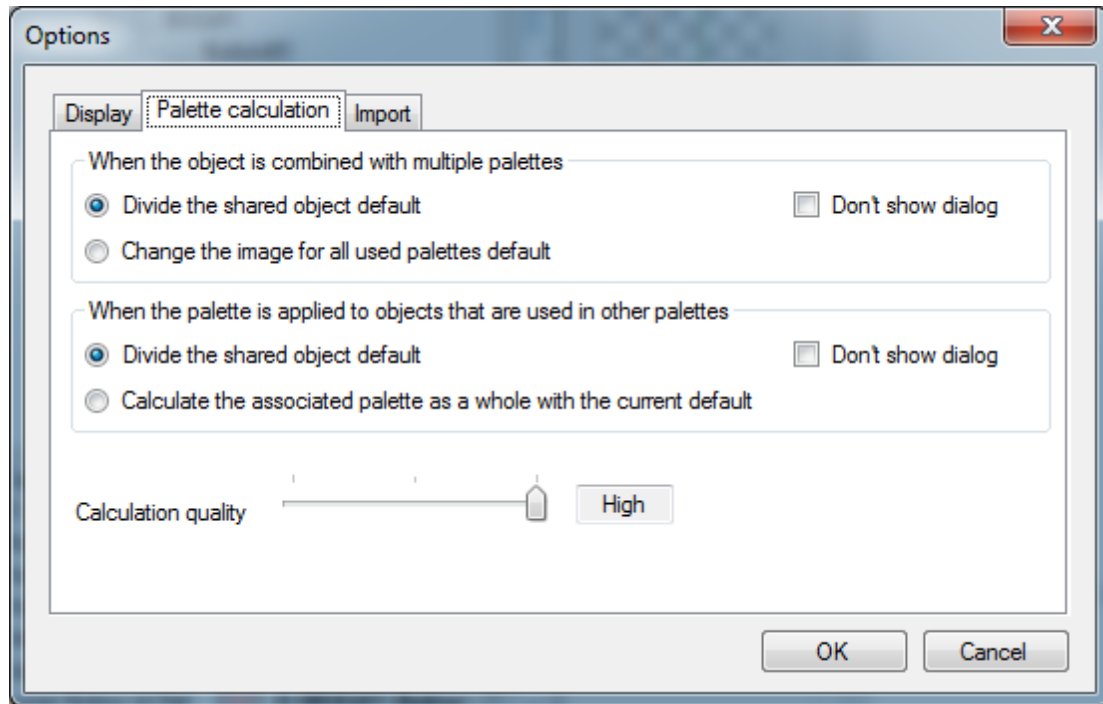
Show safety areas - show or hide special red and green frames in Page Designer for better buttons location.

Tabs alignment: Workspace - select where "Page Designer" and "Palettes and Objects" tab buttons must be located.

Tab alignment: Code - select where tabs buttons in Source Panel must be located.

2.4.2 Palette calculation

Palette calculation



The tab contains settings for working with palettes.

When the object is combined with multiple palettes

While importing object (the loading of new image for object from file) we can receive the situation when current object is used in combination not only with current palette, but also with another palettes. When IGEEditor will recalculate such object to matrix of the indexes for current palette, then old indexes will be removed and combinations of current object with the other palettes will be distorted. There 2 ways for processing for such case:

Divide the shared object default

New object will be created. Everywhere with all combinations of the current object and palette will be replaced old object ID to just created object ID. Also will be indexes recalculation for this new object. Old object will remained without any changes and without any distortions. But total number of objects in the project will be increased, and accordingly will be increased the size of destination file.

Change the image for all used palettes default

Ignore the possible image distortion for combination this objects and the other palettes. Indexes recalculation will be processed only for current palette. This mode is useful when all connected palettes are identical.

Also these two possible variant will give value to dialog that will be shown in case of collision while importing image into object. However when will be checked "Don't show dialog" box, dialog will be not displayed, but automatically will be applied variant from one of two above settings.

When the palette is applied to objects that are used in other palettes

While palette recalculating we can receive the situation, when object connected with current palette are used with combinations with another palettes. After palette recalculated, will be recalculation of matrix of indexes of all objects connected with current palette. After such recalculation images in the other palettes can be distorted. There 2 ways for processing for such case:

Divide the shared object default

Creates new object according to objects number connected with another palettes. Everywhere with all combinations of the current object and recalculated palette will be replaced old object ID to just created object ID. Images will be copied to just created objects accordingly. Given palette and connected objects will be recalculated. Total number of objects in the project will be increased, and accordingly will be increased the size of destination file.

Calculate the associated palette as a whole with the current default

Find all the palettes connected with currently recalculated through chain of objects, that are used in combination with several palettes. Recalculate all these palettes. As result, we will receive identical palettes that are connected with given palette. In that case objects that are used in all these recalculated palettes will looks like in combination with given palette.

Also these two possible variant will give value to dialog that will be shown in case of collision while palette recalculating. However when will be checked "Don't show dialog" box, dialog will be not displayed, but automatically will be applied variant from one of two above settings.

Calculation quality.

There are 3 variants for palette recalculation:

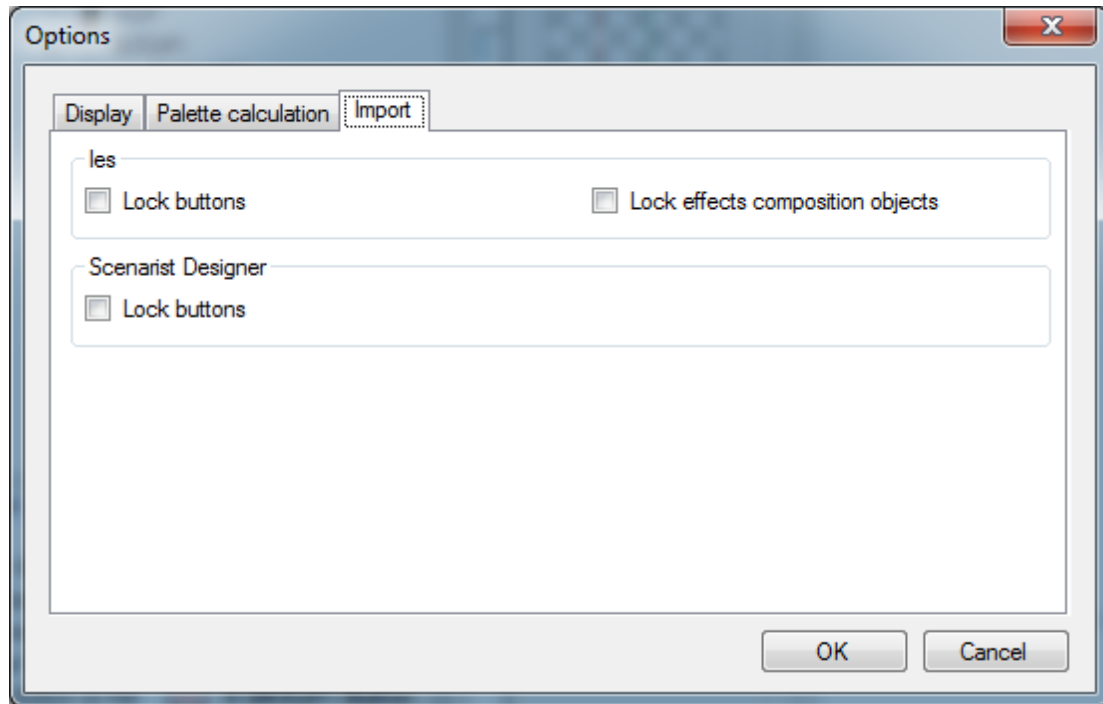
Low — bed quality, high speed.

Medium — medium quality and calculation speed.

High — maximal quality and slow calculation speed.

2.4.3 Import

Import



The tab contains settings that responsible for objects visualization after importing from different formats.

ies

Import from IES file.

Lock buttons

Lock all buttons, that prevent from arbitrary moving. You can disable this mode manually later.

Lock effects composition objects

Lock all composition objects in effect, that prevent from arbitrary moving. You can disable this mode manually later.

Scenarist Designer

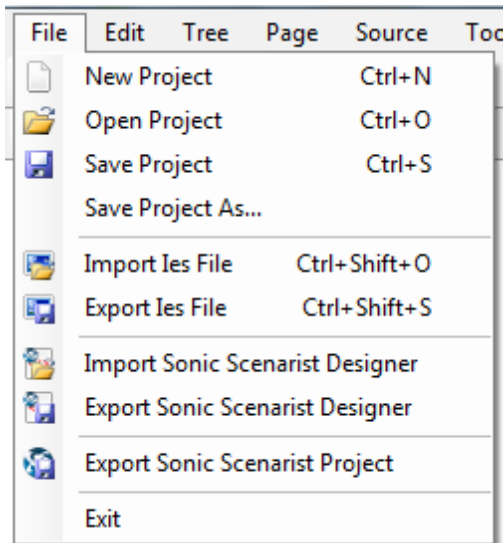
Import from Scenarist Designer file (*.designer)

Lock buttons

Lock all buttons, that prevent from arbitrary moving. You can disable this mode manually later.

2.5 Compilation and Export

Compilation and Export



After interactive menu creation, using main menu "File", user can ability to save current work in several ways:

1. As IGEEditor project file. That can be later opened in IGEEditor.
2. To export the menu into full valuable IES file, that later can be used in BD Authoring software, for example, Sonic Scenarist.
3. To export the menu into XML file in Sonic Scenarist Designer format. It also creates all necessary images for every button.
4. Create Sonic Scenarist BD project file with inserted current menu. This is useful if user has created difficult menu and used some unique features of navigation commands programming. In this case the menu can not be loaded into Scenarist manually.

2.6 Navigation commands writing

Navigation commands writing



```
If [10] == 1
GoTo Label_23
Label 0:
If [10] == 2
GoTo Label_22
Label 1:
If [10] == 3
GoTo Label_21
Label 2:
If [10] == 4
GoTo Label_20
Label 3:
If [10] == 5
GoTo Label_19
Label 4:
If [10] == 6
GoTo Label_18
Label 5:
If [10] == 7
GoTo Label_17
Label 6:
If [10] == 8
GoTo Label_16
Label 7:
If [10] == 9
GoTo Label_15
Label 8:
If [10] == 10/*0xa*/
GoTo Label_14
Label 9:
If [10] == 11/*0xb*/
GoTo Label_13
Label 10:
If [10] == 12/*0xc*/
GoTo Label_12
Label 11:
SetButtonPage Button:2
Break
Label 12:
SetButtonPage Button:13/*0xd*/
```

ⓘ Syntax check successful.

Code Source

In right part of main window is located panel for navigation commands writing. Syntax is highlighted

that helps to see errors while writing. Correctness checking is process in the same time with writing and errors are shown in log on the panel. Navigation commands will be assigned to button only if they pass the compilation successfully.

Common rules for navigation commands writing:

- Parameters are set with 3 ways:
 - using symbols "[" and "]" for general purpose registers, for example [10]
 - using symbols "{" and "}" for system registers, for example {30}
 - constants are set without any symbols, for example 20
- If command has 2 parameters, then first is destination and second is source parameter
- All parameters in command are set through space, for example Move [10] 12

[Full navigation commands list here ...](#)

2.7 Navigation commands list

Navigation commands list

Command	Meaning				
Branch Command Group					
Nop	Empty command, used for example, for align <i>No Operand.</i>				
GoTo	Jumps to another Command Line				
	Operand	Description	Allowable types		
			Immediate value	GPR	PS
	<i>command_id</i>	Order number (from zero) for the next comman.	+	+	+
	<i>Examples:</i> GoTo End — go to the command following the label “End:”. GoTo [12] — go to the command whose number is in register GPR_12. GoTo 10 — go to the 10th command (<i>Not recommended for use. Use the option labeled</i>).				
Break	Break and exit from current commands list <i>No Operand.</i>				
JumpObject	Jump to specified Movie Object				
	Operand	Description	Allowable types		
			Immediate value	GPR	PS
	<i>mobj_id</i>	Defines the <i>mobj_id</i> value for the Movie Object.	+	+	+
	<i>Examples:</i> JumpObject 1 — jump to the Movie Object with id 1. JumpObject [5] — jump to the Movie Object whose number is in register GPR_5.				
JumpTitle	Jump to specified Title				
	Operand	Description	Allowable types		
			Immediate value	GPR	PS

	<table><tr><td><i>title_number</i></td><td>Defines the <i>title_number</i></td><td>+</td><td>+</td><td>+</td></tr></table> <i>Examples:</i> JumpTitle 1 — jump to the Title with id 1. JumpTitle [5] — jump to the Title whose number is in register GPR_5.	<i>title_number</i>	Defines the <i>title_number</i>	+	+	+								
<i>title_number</i>	Defines the <i>title_number</i>	+	+	+										
CallObject	Stop current playback and jump to specified Movie Object <table><tr><th rowspan="2">Operand</th><th rowspan="2">Description</th><th colspan="3">Allowable types</th></tr><tr><th>Immediate value</th><th>GPR</th><th>PS</th></tr><tr><td><i>mobj_id</i></td><td>Defines the <i>mobj_id</i> value for the Movie Object.</td><td>+</td><td>+</td><td>+</td></tr></table> <i>Examples:</i> CallObject 1 — jump to the Movie Object with id 1. CallObject [5] — jump to the Movie Object whose number is in register GPR_5.	Operand	Description	Allowable types			Immediate value	GPR	PS	<i>mobj_id</i>	Defines the <i>mobj_id</i> value for the Movie Object.	+	+	+
Operand	Description			Allowable types										
		Immediate value	GPR	PS										
<i>mobj_id</i>	Defines the <i>mobj_id</i> value for the Movie Object.	+	+	+										
CallTitle	Stop current playback and jump to specified Title <table><tr><th rowspan="2">Operand</th><th rowspan="2">Description</th><th colspan="3">Allowable types</th></tr><tr><th>Immediate value</th><th>GPR</th><th>PS</th></tr><tr><td><i>title_number</i></td><td>Defines the <i>title_number</i></td><td>+</td><td>+</td><td>+</td></tr></table> <i>Examples:</i> CallTitle 1 — jump to the Title with id 1. CallTitle [5] — jump to the Title whose number is in register GPR_5.	Operand	Description	Allowable types			Immediate value	GPR	PS	<i>title_number</i>	Defines the <i>title_number</i>	+	+	+
Operand	Description			Allowable types										
		Immediate value	GPR	PS										
<i>title_number</i>	Defines the <i>title_number</i>	+	+	+										
Resume	Restore previously stopped playback <i>No Operand.</i>													
TerminatePL	Exit from playback of current PlayList <i>No Operand.</i>													
LinkPI	Go to specified PlayItem <table><tr><th rowspan="2">Operand</th><th rowspan="2">Description</th><th colspan="3">Allowable types</th></tr><tr><th>Immediate value</th><th>GPR</th><th>PS</th></tr><tr><td><i>PlayItem_id</i></td><td>Defines the PlayItem id.</td><td>+</td><td>+</td><td>+</td></tr></table> <i>Examples:</i> LinkPI 1 — change playback position to the PlayItem with id 1. LinkPI [5] — change playback position to the PlayItem whose number is in register GPR_5.	Operand	Description	Allowable types			Immediate value	GPR	PS	<i>PlayItem_id</i>	Defines the PlayItem id.	+	+	+
Operand	Description			Allowable types										
		Immediate value	GPR	PS										
<i>PlayItem_id</i>	Defines the PlayItem id.	+	+	+										

LinkMK	Go to specified PlayListMark				
	Operand	Description	Allowable types		
			Immediatevalue	GPR	PS
	PL_mark_id	Defines the PlayList Mark.id.	+	+	+
	<i>Examples:</i> LinkMK 1 — change playback position to the PlayList Mark with id 1. LinkMK [5] — change playback position to the PlayList Mark whose number is in register GPR_5.				
Compare Command Group					
BC or If &	Binary Compare <i>Examples:</i> BC [5] 7 If [5] & 7				
EQ or If ==	Equals <i>Examples:</i> EQ [5] 7 If [5] == 7				
NE or If !=	Not Equals <i>Examples:</i> NE [5] 7 If [5] != 7				
GE or If >=	Greater Than or Equal to <i>Examples:</i> GE [5] 7 If [5] >= 7				
GT or If >	Greater Than <i>Examples:</i> GT [5] 7 If [5] > 7				
LE or If <=	Less Than or Equals to <i>Examples:</i> LE [5] 7 If [5] <= 7				
LT or If <	Less Than <i>Examples:</i> LT [5] 7 If [5] < 7				

Set Command Group	
Move	Set value to GPR <i>Examples:</i> Move [5] 7 — move 7 in to register GPR_5.
Swap	Change values between two GPRs <i>Examples:</i> Swap [5] [7] — swap data in registers GPR_5 and GPR_7.
Add	Add value to GPR <i>Examples:</i> Add [5] 7 — move 7 + GPR_5 in to register GPR_5.
Sub	Subtract value from GPR <i>Examples:</i> Sub [5] 7 — move GPR_5 - 7 in to register GPR_5.
Mul	Multiply value to GPR <i>Examples:</i> Mul [5] 7 — move GPR_5 × 7 in to register GPR_5.
Div	Divide value to GPR <i>Examples:</i> Div [5] 7 — move GPR_5 / 7 in to register GPR_5.
Mod	Modulus value to GPR <i>Examples:</i> Mod [5] 7 — move GPR_5 % 7 in to register GPR_5.
Rnd	Store Random number in GPR <i>Examples:</i> Rnd [5] 7 — move random value from 1 to 7 in to register GPR_5.
And	Binary AND to GPR <i>Examples:</i> And [5] 7 — move GPR_5 & 7 in to register GPR_5.
Or	Binary OR to GPR <i>Examples:</i> Or [5] 7 — move GPR_5 7 in to register GPR_5.
Xor	Binary XOR to GPR <i>Examples:</i> Xor [5] 7 — move GPR_5 ^ 7 in to register GPR_5.
BitSet	Set bit in GPR

	<i>Examples:</i> BitSet [5] 7 — set 7 th bit in GPR_5 in to 1.
BitClear	Set bit to "0" in GPR <i>Examples:</i> BitSet [5] 7 — set 7 th bit in GPR_5 in to 0.
ShiftLeft	Zeros are shifted into low order bit in GPR <i>Examples:</i> ShiftLeft [5] 7 — shift left GPR_5 value by 7.
ShiftRight	Zeros are shifted into high order bit in GPR <i>Examples:</i> ShiftRight [5] 7 — shift right GPR_5 value by 7.
SetStream	Set Audio, PG, Text subtitle, Angle and IG streams <i>Examples:</i> SetStream ShowPG_textST:Off Audio:[4075] PG_textST:[4076] SetStream ShowPG_textST:On Audio:[5] PG_textST:[6] IG:[7] Angle:[8]
SetNVTimer	Set Navigation Timer <i>Examples:</i> SetNVTimer 1 10 — jump to Movie Object with Id 1 after 10 seconds.
SetButtonPage	Set Button ID and/or Page ID <i>Examples:</i> SetButtonPage Button:[5] Page(Effec:On):[6]
EnableButton	Set Button to "normal" state <i>Examples:</i> EnableButton [5]
DisableButton	Set Button to "normal" state <i>Examples:</i> DisableButton [5]
SetSecondaryStream	Set Secondary Video, Secondary Audio and PiP PG / Text subtitle streams <i>Examples:</i> SetSecondaryStream ShowVideo:On PlayAudio:On ShowPiP_PG_textST:On VideoSize:0xf Video:1 Audio:2 PiP_PG_textST(Valid:On):3
PopUpMenuOff	Turn off pop up menu
StillOn	Hold playback

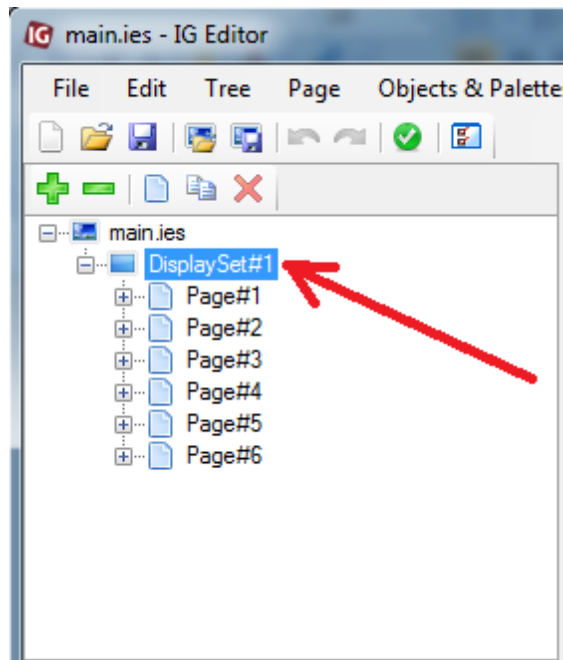
StillOff

Restart playback after Hold

3 Interactive Menu Components

3.1 Display Set

Display Set



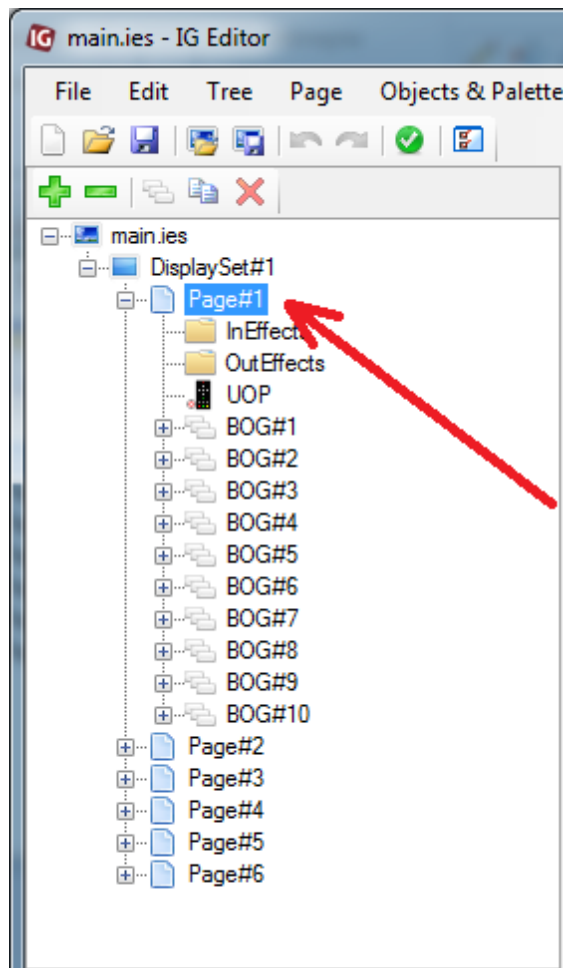
Caption	Text of tree node, corresponding to the current Display Set.
Video	
Width	This field describes the video width of the associated HDMV video stream. Possible Width values are: 1920, 1440, 1280, 720
Height	This field describes the video height of the associated HDMV video stream. Possible Height values are: 1080, 720, 480, 576. Possible WidthxHeight combinations are: 1920x1080, 1440x1080, 1280x720, 720x480, 720x576.
Frame Rate	This is a integer used to define the frame_rate of the associated HDMV video stream value.
Composition	
Number	This field uniquely identifies the Display Update described by the Composition Segment in the HDMV graphics stream. When a Display Update changes, the number is incremented (modulo 2^{16}). When a Display Update does not change in consecutive Composition Segments, the number field shall not be incremented.

	The Number field of the first Composition Segment within a HDMV graphics stream shall have the value '0' and subsequent "Epoch Start" Compositions shall always have an incremented Number. The Number in a graphics stream may be reset back to '0' in a PlayList when two graphics streams are connected by a seamless connection.										
State	This field signals the type of Display Set that this Composition is contained in. <table> <tr> <th>Display Set Type</th><th>Comments</th></tr> <tr> <td>0 (Normal Case)</td><td>The Display Set contains only the elements that are changed from the previous composition.</td></tr> <tr> <td>1 (Acquisition Point)</td><td>The Display Set contains all the elements needed to the next composition.</td></tr> <tr> <td>2 (Epoch Start)</td><td>Indicates the start of a new Epoch. The Display Set all elements needed to display the next composition</td></tr> <tr> <td>3 (Epoch Continue)</td><td>Indicates that an Epoch may be continued across in graphics stream from a previous graphics stream wh seamless connection conditions apply. The Display contains all elements needed to display the next composition.</td></tr> </table>	Display Set Type	Comments	0 (Normal Case)	The Display Set contains only the elements that are changed from the previous composition.	1 (Acquisition Point)	The Display Set contains all the elements needed to the next composition.	2 (Epoch Start)	Indicates the start of a new Epoch. The Display Set all elements needed to display the next composition	3 (Epoch Continue)	Indicates that an Epoch may be continued across in graphics stream from a previous graphics stream wh seamless connection conditions apply. The Display contains all elements needed to display the next composition.
Display Set Type	Comments										
0 (Normal Case)	The Display Set contains only the elements that are changed from the previous composition.										
1 (Acquisition Point)	The Display Set contains all the elements needed to the next composition.										
2 (Epoch Start)	Indicates the start of a new Epoch. The Display Set all elements needed to display the next composition										
3 (Epoch Continue)	Indicates that an Epoch may be continued across in graphics stream from a previous graphics stream wh seamless connection conditions apply. The Display contains all elements needed to display the next composition.										
Interactive Data											
Stream Model	This field indicates whether the Interactive Composition and associated data are multiplexed or non-multiplexed in the HDMV MPEG-2 transport stream. Possible Stream Model values are: - 0, Multiplexed; - 1, Non-Multiplexed.										
User Interface Model	This field indicates whether a "Pop-Up" or "Always-On" User Interface model is used for the Interactive Displays described in the Interactive Composition. User Interface Model: - 0, Always-On; - 1, Pop-Up. If the Stream Model field value is '0', the User Interface Model field shall have a value of '0'.										
Composition Time Out Pts (If User Interface Model is 1 (Pop-Up))	This field describes the end time, on the system time base of MPEG-2 transport stream (measured in units of 90kHz), of the Interactive Display Period in an Epoch. At the end time, the Interactive Display is no longer active and consequently shall no longer be displayed, the Interactive Display will be removed with frame accuracy at the time defined by the Composition Time Out Pts field value. When this field is set to 0, the Interactive Display shall never "time-out".										

Selection Time Out Pts (If User Interface Model is 1 (Pop-Up))	This field describes, on the system time base of MPEG-2 transport stream (measured in units of 90kHz), the Button selection period termination time of the Interactive Display in an Epoch. At the time defined by the value of the Selection Time Out Pts field. No Buttons shall be in the selected or activated state from the time defined by Selection Time Out Pts field through the remainder of the Interactive Display Period.
User Time Out Duration	This field describes, in units of 90 kHz, a period of time after which a Page shall “time-out” if no User Operations are received by the decoder. When this field is set to 0, the Page shall never “time-out”.
Background Image	The wallpaper, which will be used when displaying all child elements of Display Set in the Page designer. Note that the background image will be displayed only if Show background image button () is checked. Background Image in Page has priority over Background Image in Display Set.

3.2 Page

Page

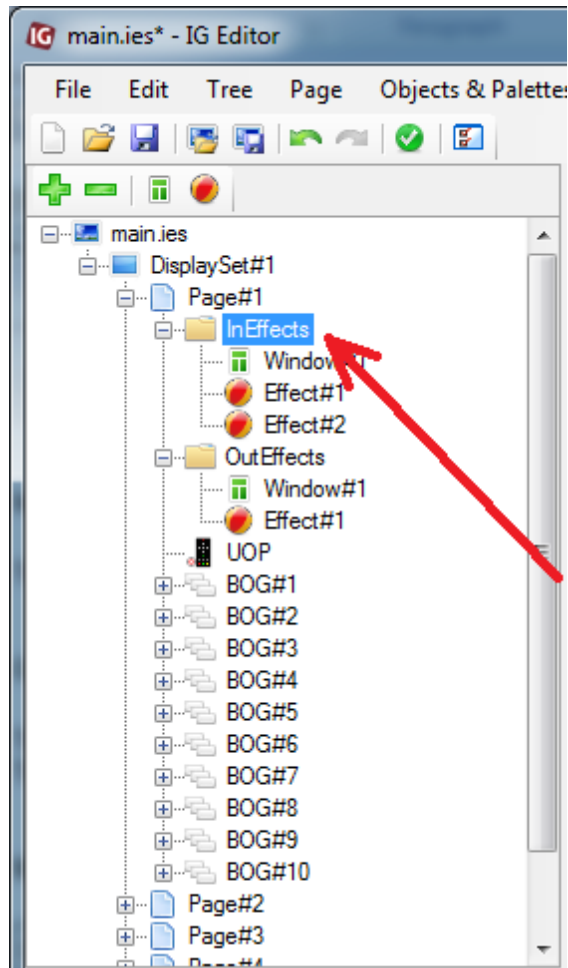


Caption	Text of tree node, corresponding to the current Page.
ID	The page ID field uniquely identifies the Page in the Epoch. Once a Page has been introduced in an Epoch, it is valid for the remainder of an Epoch. Values 0x00 through to 0xFE are valid page ID field values for page structures in Interactive Graphics streams. The value of each page ID field shall be unique amongst the set of page ID fields in an Interactive Composition Segment, i.e. a particular Page shall appear only once in an Interactive Graphics Segment.
Version Number	This field indicates the “version”, within an Epoch, of the Page for which this page structure carries data. All Pages are introduced at the beginning of an Epoch and shall have an initial page Version Number field value equal to ‘0’. Once a Page has been introduced in an Epoch, page structures carrying an update to the data of the Page shall have an incremented (modulo 2⁸) value in the page Version Number field.

Animation Frame Rate Code	This field is used to provide the animation frame-rate to be applied when displaying button states which are animated. When the Animation Frame Rate Code is set to 0, only the first Object in an Object sequence described in a button state shall be displayed. Otherwise, animated button states shall be displayed with an animation_frame_rate derived as follows: animation_frame_rate = video frame rate / Animation Frame Rate Code
Default Selected Button Id Ref	This field provides the value of the button ID associated to the Button that is selected as default when the presentation of the Interactive Display begins. When this value is set to 65535 (0xFFFF), the page does not specify the Button to be automatically. If the Default Selected Button Id Ref field is not set to 65535 (0xFFFF), the field shall be set to the value of a " Default Selected Button Id Ref " field contained in a button overlap group structure defined in this page.
Default Activated Button Id Ref	This field provides the value of the button ID associated to the Button, if any, which is automatically activated at the time defined by the Selection Time Out Pts field. When this value is set to 65534 (0xFFFE), the Button that is currently selected is activated at the time defined by the Selection Time Out Pts field. When this value is set to 65535 (0xFFFF), no Button is automatically activated. If the default_activated_button_id_ref field is not set to 65534 (0xFFFE) or 65535 (0xFFFF), the field shall be set to a button ID of a button which is defined in this page.
Palette Id Ref	The Palette Id Ref field specifies the PalettId associated with the Palette that shall be used for the Interactive Display described in this page.
Background Image	The wallpaper, which will be used when displaying all child elements of Page in the Page designer. Note that the background image will be displayed only if Show background image button () is checked. Background Image in Page has priority over Background Image in Display Set.

3.2.1 InEffects/OutEffects

InEffects/OutEffects



InEffects

The InEffects structure defines a sequence of Display Updates, which are presented immediately before the Page is displayed.

OutEffects

The OutEffects structure defines a sequence of Display Updates, which are presented immediately after the Page is removed from display.

The **SetButtonPage** command can instruct the Graphics Controller to not present an OutEffects sequence with the Effect_off_flag.

Window Properties

Caption	Text of tree node, corresponding to the current Window.
ID	The window ID uniquely identifies a Window on the Graphics Plane.
Horizontal Position	The field specifies the horizontal position of the top left pixel of this Window on the Graphics Plane. The specified horizontal position shall be within the range 0 to video_width – 1.
Vertical Position	The field specifies the vertical position of the top left pixel of this Window on the Graphics Plane. The specified vertical position shall be within the range 0 to video_height – 1.
Width	The field specifies the width of this Window on the Graphics Plane. The specified width shall be within the range 1 to video_width – window_horizontal_position.
Height	This field specifies the height of this Window on the Graphics Plane. The specified height shall be within the range 1 to video_height – window_vertical_position.

Effect Properties

Caption	Text of tree node, corresponding to the current Effect.
Effect Duration	This field describes, in units of 90 kHz, the period of time for which the Display Update described in this effect shall be displayed.
Palette Id Ref	The Palette Id Ref field specifies the PaletteID associated with the Palette that shall be used for the Display Update described in this effect.

CompositionObject Properties

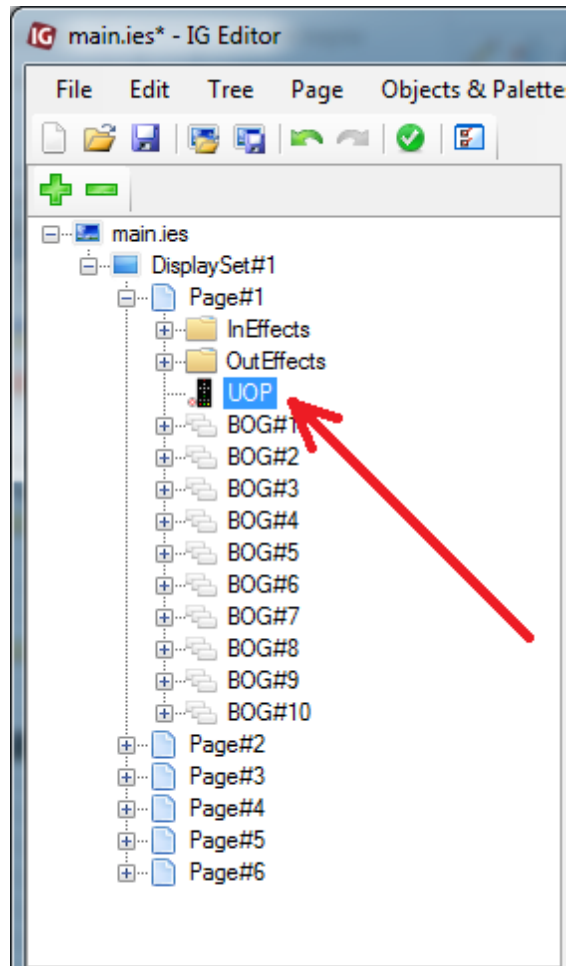
Caption	Text of tree node, corresponding to the current CompositionObject.
Object Id Ref	The Object Id Ref field specifies the ObjectID associated with the Object that shall be used for this Composition Object as part of the Display Update.
Window Id Ref	The Window Id Ref field specifies the window ID associated with the window to which the CompositionObject is allocated.
Forced On Flag	<i>The Forced On Flag has no meaning when a composition object is used in interactive composition.</i>
Object Horizontal Position	This field specifies the horizontal position of the top left pixel of the CompositionObject pixels on the Graphics Plane. The specified horizontal position shall be within the range between window_horizontal_position and window_horizontal_position plus window_width, where window_width is defined in the Window associated with the CompositionObject.
Object Vertical Position	This field specifies the vertical position of the top left pixel of CompositionObject pixels on the Graphics Plane. The specified vertical position shall be within the range between window_vertical_position and window_vertical_position plus window_height, where window_height is defined in the Window associated with the CompositionObject.
Object Cropped Flag	This field indicates the validity and presence of a cropping_rectangle structure. If the cropping_rectangle structure is not present (and consequently no cropping will

	be applied) then this field is set to False. If the cropping_rectangle structure is present (and consequently cropping shall be applied) this field is set to True.
Cropping Horizontal Position	This field specifies the horizontal position of the top left corner of the cropping_rectangle to be applied during rendering of the Object. The value of this field shall be in the range 0 to object_width – 1 (object_width is specified in the Object identified by the Object Id Ref field). <i>The addressing of the Object in the two fields above is based on a coordinate system which has an origin at the top/left corner of the Object, with the positive x-axis pointing towards the right, the positive y-axis pointing down. One unit equals one "pixel" in the Object.</i>
Cropping Vertical Position	This field specifies the vertical position of the top left corner of the cropping_rectangle to be applied during rendering of the Object. The value of this field shall be in the range 0 to object_height – 1 (object_height is specified in the Object identified by the Object Id Ref field). <i>The addressing of the Object in the two fields above is based on a coordinate system which has an origin at the top/left corner of the Object, with the positive x-axis pointing towards the right, the positive y-axis pointing down. One unit equals one "pixel" in the Object.</i>
Cropping Width	This field specifies the horizontal length of the cropping rectangle, expressed in terms of the number of pixels. The value within this field shall be within the range 1 to object_width - object_cropping_horizontal_position.
Cropping Height	This field specifies the vertical length of the cropping rectangle, expressed in terms of the number of pixels. The value within this field shall be within the range 1 to object_height - object_cropping_vertical_position.
Object Width	Read only field, which is specified in the Object identified by the Object Id Ref field.
Object Height	Read only field, which is specified in the Object identified by the Object Id Ref field.

CompositionObject pixels shall always be contained entirely within the associated Window i.e. no pixel data of the CompositionObject shall be outside the area specified by the Window.

3.2.2 User Operations (UOP)

User Operations (UOP)



Value	Meaning
False	The corresponding User Operation is permitted .
True	The corresponding User Operation is prohibited . Players prohibit the UO only, not prohibit the equivalent navigation command.

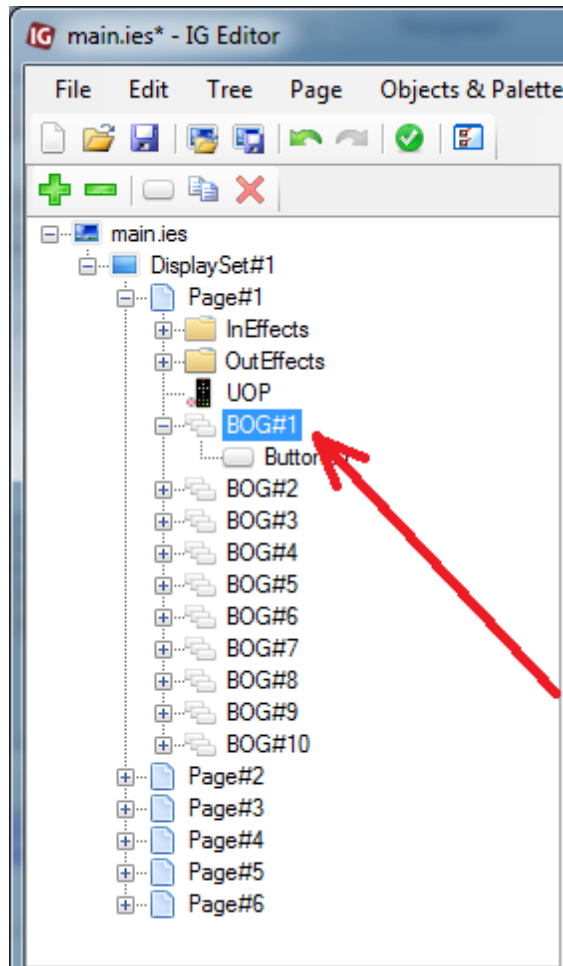
Chapter Search	This field indicates whether <i>Chapter Search(UO)</i> is forbidden or not.
Time Search	This field indicates whether <i>Time Search(UO)</i> is forbidden or not. The operation to start playback at the position identified by elapsed time in the main playback path of the current PlayList of a Movie Title.
Skip to Next Point	This field indicates whether <i>Skip to Next Point(UO)</i> is forbidden or not. The operation to move to next Entry-mark position in the current PlayList.

Skip Back to Previous Point	This field indicates whether <i>Skip Back to Previous Point(UO)</i> is forbidden or not. The operation to move back to previous Entry-mark position in the current PlayList.
Stop	This field indicates whether <i>Stop(UO)</i> is forbidden or not. The Stop User Operation stops playback of the currently active Title.
Pause On	This field indicates whether <i>Pause On(UO)</i> is forbidden or not. Hold the presentation playback while keeping the last displayed picture on the screen. The Playback Control Engine enters the "Pause" state and the Interactive Graphics function is not active. (e.g. Interactive User Operations have no effect).
Still Off	This field indicates whether <i>Still Off(UO)</i> is forbidden or not. The operation to release still state and continue playback. This UO only has an effect when the Presentation Engine is in Still state. In all other states this UO has no effect.
Forward Play	This field indicates whether <i>Forward Play(UO)</i> is forbidden or not. The operation to change playback speed at specified "Speed" in forward direction.
Backward Play	This field indicates whether <i>Backward Play(UO)</i> is forbidden or not. The operation to change playback speed at specified "Speed" in backward direction.
Resume	This field indicates whether <i>Resume(UO)</i> is forbidden or not. The Resume User Operation resumes playback of a previously suspended Movie Object.
Move Up Selected Button	This field indicates whether <i>Move Up Selected Button(UO)</i> is forbidden or not. The operation to change selected state of a button from the current selected button to the upper one in accordance with neighboring information.
Move Down Selected Button	This field indicates whether <i>Move Down Selected Button(UO)</i> is forbidden or not. The operation to change selected state of a button from the current selected button to the lower one in accordance with neighboring information.
Move Left Selected Button	This field indicates whether <i>Move Left Selected Button(UO)</i> is forbidden or not. The operation to change selected state of a button from the current selected button to the left one in accordance with neighboring information.
Move Right Selected Button	This field indicates whether <i>Move Right Selected Button(UO)</i> is forbidden or not. The operation to change selected state of a button from the current selected button to the right one in accordance with neighboring information.
Select Button	This field indicates whether <i>Select Button(UO)</i> is forbidden or not. The operation to change selected state of a button from the current selected button to the button specified by "Button Number".
Activate Button	This field indicates whether <i>Activate Button(UO)</i> is forbidden or not. The operation to activate the selected button.
Select Button And Activate	This field indicates whether <i>Select Button And Activate(UO)</i> is forbidden or not. The operation forcedly to select and activate the button specified by "Button Number".
Primary Audio Stream Number Change	This field indicates whether <i>Primary Audio Stream Number Change(UO)</i> is forbidden or not. The operation to change presentation of an audio stream to the other audio stream specified by "primary_audio_stream_number".

Angle Number Change	This field indicates whether <i>Angle Number Change(UO)</i> is forbidden or not. The operation to change presentation angle to the other angle specified by "angle_number".
Popup On	This field indicates whether <i>Popup On(UO)</i> is forbidden or not. This User Operation turns on the Pop-Up menu on the screen. If the interactive Graphics stream uses the Always-On User Interface, this User Operation shall be ignored. Only when a pop-up menu doesn't show on the screen this operation is valid.
Popup Off	This field indicates whether <i>Popup Off(UO)</i> is forbidden or not. This User Operation turns off the Pop-Up menu on the screen. If the interactive Graphics stream uses the Always-On User Interface, this User Operation shall be ignored. Only when a pop-up menu shows on the screen this operation is valid.
PG TextST Enable Disable	This field indicates whether <i>PG TextST Enable Disable(UO)</i> is forbidden or not. The operation to change the display of both PG TextST stream and PiP PG TextST stream from enable to disable, and vice versa.
PG TextST Stream Number Change	This field indicates whether <i>PG TextST Stream Number Change(UO)</i> is forbidden or not. The operation to change presentation of a PG TextST stream to the other PG TextST stream specified by "PG_textST_stream_number". User can use either the "PG TextST Stream Number Change" UO or the "PiP PG TextST Stream Number Change" UO at one time, can not use both at the same time.
Secondary Video Enable Disable	This field indicates whether <i>Secondary Video Enable Disable(UO)</i> is forbidden or not. The operation to change the presentation of Secondary video stream from enable to disable, and vice versa.
Secondary Video Stream Number Change	This field indicates whether <i>Secondary Video Stream Number Change(UO)</i> is forbidden or not. The operation to change presentation of a Secondary video stream to the other Secondary video stream specified by "secondary_video_stream_number".
Secondary Audio Enable Disable	This field indicates whether <i>Secondary Audio Enable Disable(UO)</i> is forbidden or not. The operation to change the presentation of Secondary audio stream from enable to disable, and vice versa.
Secondary Audio Stream Number Change	This field indicates whether <i>Secondary Audio Stream Number Change(UO)</i> is forbidden or not. The operation to change presentation of a Secondary audio stream to the other Secondary audio stream specified by "secondary_audio_stream_number".
PiP PG TextST Stream Number Change	This field indicates whether <i>PiP PG TextST Stream Number Change(UO)</i> is forbidden or not. The operation to change presentation of a PG TextST stream to the other PG TextST stream specified by "PiP_PG_textST_stream_number". User can use either the "PG TextST Stream Number Change" UO or the "PiP PG TextST Stream Number Change" UO at one time, can not use both at the same time.

3.2.3 Button overlap group (BOG)

Button overlap group (BOG)

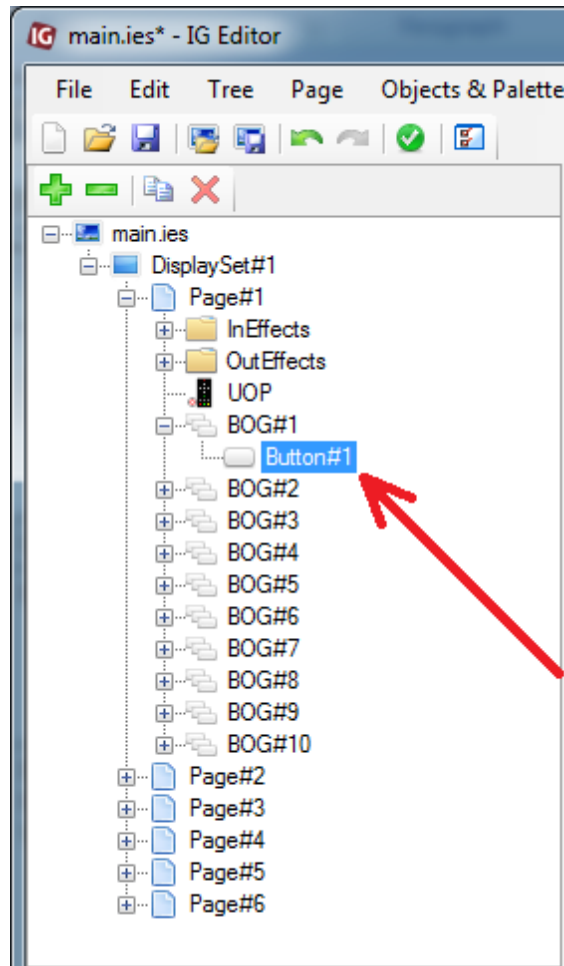


The button overlap group (BOG) structure defines a group of button structures. At most one Button defined in a button overlap group shall be in a non-disabled state at any one time.

Caption	Text of tree node, corresponding to the current BOG.
Default Valid Button Id Ref	This field indicates the button ID value associated with the button that is shown as default when the presentation of the Interactive Display begins. When this value is set to 65535(0xFFFF), no button from this BOG shall be shown when the presentation of the Interactive Display begins. If the Default Valid Button Id Ref field is not set to 0xFFFF, the field shall be set to the button ID of a button which is defined in this BOG.

3.2.4 Button

Button



Caption	Text of tree node, corresponding to the current Button.
ID	The ID field uniquely identifies the button in a page. Values 0x0000 through to 0x1FDF are valid ID field values for button structures in Interactive Graphics streams. The value of each ID field shall be unique amongst the set of button_id fields in a page i.e. a particular Button shall appear only once in an Interactive Display.
Button Numeric Select Value	This field represents the value associated with this button for numeric selection. If this field is set to 65535 (0xFFFF) then numeric selection is not available for this button. Otherwise the Select Button (Button Number) User Operation may be used to select this button with the value defined by the Button Numeric Select Value field. Values '0' through '9999' are valid Button Numeric Select Value field values for use in an Interactive Display. <i>Button structures in the same BOG may or may not have the same Button Numeric Select Value. Button structures shall not share the same Button Numeric</i>

	<i>Select Value with Button structures if they are in different BOG structures.</i>	
Auto Action Flag	This field indicates the operation mode of a Button.	
	Value	Definition
	False	The Button does not automatically change to an activated state when it becomes selected.
	True	The Button is automatically changed to the activated state without displaying any selected Button images, when the Button becomes selected.
Horizontal Position	This field specifies the horizontal position of the top left pixel of this button in the Interactive Display. The specified horizontal position shall be in the range 0 to video_width-1.	
Vertical Position	This field specifies the vertical position of the top left pixel of this button in the Interactive Display. The specified vertical position shall be within the range 0 to video_height-1. <i>The area associated with a button structure may overlap with an area associated with another button only if both button structures are contained in the same BOG. Button areas shall always be contained entirely within the bounds defined by video_width and video_height.</i>	
Upper Button Id Ref	This field specifies the button ID of the Button to receive the selected state if the Move Up Selected Button User Operation function is executed when this button is in the selected state. If the Upper Button Id Ref field is set to the same value as the button ID field for this button, the Move Up Selected Button User Operation function will be ignored when this button is selected. <i>The field shall be set to either the value of a button ID field of a button that is contained in a different BOG structure within the same page or the value of the button ID field of this button.</i>	
Lower Button Id Ref	This field specifies the button ID of the Button to receive the selected state if the Move Down Selected Button User Operation function is executed when this button is in the selected state. If the Lower Button Id Ref field is set to the same value as the button ID field for this button, the Move Down Selected Button User Operation function will be ignored when this button is selected. <i>The field shall be set to either the value of a button ID field of a button that is contained in a different BOG structure within the same page or the value of the button ID field of this button.</i>	
Left Button Id Ref	This field specifies the button ID of the Button to receive the selected state if the Move Left Selected Button User Operation function is executed when this button is in the selected state. If the Left Button Id Ref field is set to the same value as the button ID field for this button, the Move Left Selected Button User Operation function will be ignored when this button is selected. <i>The field shall be set to either the value of a button ID field of a button that is contained in a different BOG structure within the same page or the value of the button ID field of this button.</i>	
Right Button Id Ref	This field specifies the button ID of the Button to receive the selected state if the Move Right Selected Button User Operation function is executed when this button is in the selected state. If the Right Button Id Ref field is set to the same	

	value as the button ID field for this button, the Move Right Selected Button User Operation function will be ignored when this button is selected. <i>The field shall be set to either the value of a button ID field of a button that is contained in a different BOG structure within the same page or the value of the button ID field of this button.</i>						
Normal Start Object Id Ref	This field specifies the ObjectID of the first Object in a sequence, which shall be used to present this button in the normal state.						
Normal End Object Id Ref	This field specifies the ObjectID of the last Object in a sequence, which shall be used to present this button in the normal state.						
Normal Repeat Flag	This field specifies whether the animation sequence defined by the Normal Start Object Id Ref and Normal End Object Id Ref shall be continuously repeated. If the Normal Start Object Id Ref and Normal End Object Id Ref fields have the same value, the Normal Repeat Flag shall be set to a value of False. <table> <tr> <th>Value</th><th>Definition</th></tr> <tr> <td>False</td><td>The animation sequence shall not be continuously repeated.</td></tr> <tr> <td>True</td><td>The animation sequence shall be continuously repeated.</td></tr> </table>	Value	Definition	False	The animation sequence shall not be continuously repeated.	True	The animation sequence shall be continuously repeated.
Value	Definition						
False	The animation sequence shall not be continuously repeated.						
True	The animation sequence shall be continuously repeated.						
Selected State Sound Id Ref	If Selected State Sound Id Ref field is not set to 255(0xFF), this field specifies a sound_id value of sound data in the sound.bdmv file which shall be presented when this button is changed to the selected state. The sound playback starts when the animation sequence defined by the Selected Start Object Id Ref and Selected End Object Id Ref is initiated. If the Selected State Sound Id Ref field is set to 255(0xFF), no sound data is associated with the selected state of this button.						
Selected Start Object Id Ref	This field specifies the ObjectID of the first Object in a sequence, which shall be used to present this button in the selected state.						
Selected End Object Id Ref	This field specifies the ObjectID of the last Object in a sequence, which shall be used to present this button in the selected state.						
Selected Repeat Flag	This field specifies whether the animation sequence defined by the Selected Start Object Id Ref and Selected End Object Id Ref shall be continuously repeated. If the Selected Start Object Id Ref and Selected End Object Id Ref fields have the same value, the Selected Repeat Flag shall be set to a value of False. <table> <tr> <th>Value</th><th>Definition</th></tr> <tr> <td>False</td><td>The animation sequence shall not be continuously repeated.</td></tr> <tr> <td>True</td><td>The animation sequence shall be continuously repeated.</td></tr> </table>	Value	Definition	False	The animation sequence shall not be continuously repeated.	True	The animation sequence shall be continuously repeated.
Value	Definition						
False	The animation sequence shall not be continuously repeated.						
True	The animation sequence shall be continuously repeated.						
Activated State Sound Id Ref	If Activated State Sound Id Ref field is not set to 255(0xFF), this field specifies a sound_id value of sound data in the sound.bdmv file which shall be presented when this button is changed to the activated state. The sound playback starts when the animation sequence defined by the Activated Start Object Id Ref and Activated End Object Id Ref is initiated. If the Activated State Sound Id Ref field is set to 255(0xFF), no sound data is						

	associated with the activated state of this button.
Activated Start Object Id Ref	This field specifies the ObjectID of the first Object in a sequence, which shall be used to present this button in the activated state.
Activated End Object Id Ref	This field specifies the ObjectID of the last Object in a sequence, which shall be used to present this button in the activated state.
Width	Read only field, which is specified in the Object identified by the Normal Start Object Id Ref field (if exist) or Activated Start Object Id Ref field (if exist) or . Selected Start Object Id Ref field (if exist) in that order.
Height	Read only field, which is specified in the Object identified by the Normal Start Object Id Ref field (if exist) or Activated Start Object Id Ref field (if exist) or . Selected Start Object Id Ref field (if exist) in that order.

1. For normal, selected and activated state descriptions above, when Start Object Id Ref and End Object Id Ref are set to 65535(0xFFFF) no Object shall be presented.
2. For normal, selected and activated state descriptions above, all Objects with an ObjectID between Start Object Id Ref and End Object Id Ref shall exist (except when (1) above applies). All referenced Objects for normal, selected and activated states shall have the same object_width and object_height.
3. For normal, selected and activated state descriptions above, if Start Object Id Ref and End Object Id Ref have the same value, only one Object shall be presented for the corresponding Button state.
4. For normal, selected and activated state descriptions above, if Start Object Id Ref differs from End Object Id Ref, the sequence of Objects so described should be presented with the animation frame-rate described by Page Animation Frame Rate Code. If Start Object Id Ref has a smaller field value than End Object Id Ref, then the sequence of Objects start from the ObjectID value indicated by Start Object Id Ref and include every ObjectID value up to (and including) the ObjectID value indicated by End Object Id Ref. If Start Object Id Ref has a larger field value than End Object Id Ref, then the sequence of Objects shall start from the ObjectID value indicated by Start Object Id Ref and include every ObjectID value down to (and including) the ObjectID value indicated by End Object Id Ref.

4 Player Registers

4.1 General Purpose Registers (GPRs)

General Purpose Registers (GPRs)

A GPR stores a fixed length variable. The GPR stores the variable as a 32-bit unsigned integer. The BD-ROM Player has 4096 GPRs in total.

GPRs are written in the program as a number value in square brackets. For example: `[5]` — GPR 5.

4.2 Player Status Registers (PSRs)

Player Status Registers (PSRs)

A PSR stores a fixed length variable. The PSR stores the variable as a 32-bit unsigned integer. The BD-ROM Player has 128 PSRs including reserved ones in total.

PSRs are written in the program in three equivalent forms:

1. Number in the curly brackets: {5};
2. Name in the curly brackets: {Chapter};
3. Name with number in the round brackets in the curly brackets: {Chapter(5)}

PSR number	Name	Meaning	Type
0	InteractiveGraphics	Interactive Graphics Stream Number. Initial Value: 1 <i>0 : Reserved</i> <i>1 to 32 : Interactive Graphics stream number</i> <i>Others : reserved</i>	Playback Status
1	PrimaryAudio	Primary Audio Stream Number. Initial Value: 0xFF <i>0 : Reserved</i> <i>1 to 32 : Primary audio stream number</i> <i>0xFF : Primary audio stream is not selected or no Primary audio stream</i> <i>Others : reserved</i>	Playback Status
2	PGPiPPGTextST	PG TextST Stream Number and PiP PG TextST Stream Number. Initial Value: 0x0FFF0FFF disp_s_flag: <i>0 : Display of both "PG textST stream" and "PiP PG textST stream" is disable</i> <i>1 : Display of both "PG textST stream" and "PiP PG textST stream" is enable</i> PiP_PG_textST_valid_flag: <i>0 : The PG TextST stream number defined in PSR2 shall be used when a Secondary video stream is displayed in the current PlayItem presentation</i> <i>1 : The PiP PG TextST stream number</i>	Playback Status

		<i>defined in PSR2 shall be used when a Secondary video stream is displayed in the current PlayItem presentation</i> PG TextST stream number: <i>0 : Reserved</i> <i>1 to 255 : PG TextST stream number</i> <i>0xFFFF : PG TextST stream number is not selected or no PG TextST stream</i> Others : reserved PiP PG TextST stream number: <i>0 : Reserved</i> <i>1 to 255 : PiP PG TextST stream number</i> <i>0xFFFF : PiP PG TextST stream number is not selected or no PiP PG TextST stream</i> Others : reserved	
3	Angle	Angle Number. Initial Value: 1 <i>0 : Reserved</i> <i>1 to 9 : Angle number</i> Others : reserved	Playback Status
4	Title	Title Number. Initial Value: 0xFFFF <i>0xFFFF: title_number value for FirstPlayback</i> <i>0 : title_number value for TopMenu</i> <i>1 to 999 : title_number values for Titles</i> Others : reserved	Playback Status
5	Chapter	Chapter Number. Initial Value: 0xFFFF <i>0 : Reserved</i> <i>1 to 999 : chapter_number</i> <i>0xFFFF : Chapter number is invalid</i> Others : reserved	Playback Status
6	PlayList	PlayList id. Initial Value: 0 <i>0 to 1999 : PlayList_id</i> Others : reserved	Playback Status
7	PlayItem	PlayItem id.	Playback Status

		Initial Value: 0 <i>0 to 998 : PlayItem_id</i>	
8	PresentationTime	Presentation Time in 45kHz. Initial Value: 0 The PSR8 represents presentation time in the playing interval from IN_time until OUT_time of the current PlayItem, measured in units of a 45 kHz clock. The PSR8 is reset to an IN_time value of the PlayItem() at the start of the PlayItem presentation. <i>0 to 0xFFFFFFFF : Presentation Time</i>	Playback Status
9	Timer	Navigation Timer. Initial Value: 0 The navigation timer is cancelled on transfer to a different Title (including TopMenu) from the Title which is currently under playback. When the Title / TopMenu playback is terminated, navigation timer is cancelled. <i>0 to 300 : Remaining Timer Value (in second)</i> <i>Others : reserved</i>	Playback Status
10	SelectedButton	Button id in Selected State. Initial value: 0xFFFF <i>0 to 0x1FDF: Selected Button id</i> <i>0xFFFF : Button id is invalid</i> <i>Others : reserved</i>	Playback Status
11	MenuPage	Page id. Initial Value: 0 <i>0 to 0xFE : Page id</i> <i>Others : reserved</i>	Playback Status
12	SelectedStyle	User Style Number. Initial value: 0xFF <i>1 to 25 : user_style_number</i> <i>0xFF : User Style is not selected</i> <i>Others : reserved</i>	Playback Status

13	Parental	Parental Level. Represents the age for the parental control. 0 to 255 : User's age Others : reserved	Player Setting
14	SecondaryAudioVideo	Secondary Audio Stream Number and Secondary Video Stream Number Initial Value: 0x0FFFF disp_v_flag: 0 : Presentation of Secondary Video is disable 1 : Presentation of Secondary Video is enable disp_a_flag: 0 : Presentation of Secondary Audio is disable 1 : Presentation of Secondary Audio is enable Secondary Video Size: 0x0 : Presentation of Secondary video is scaled according to pip_scale[i] values in pip_metadata of the current PlayItem. 0xF : Presentation of Secondary video is scaled to the size of full screen regardless of pip_scale[i] values in pip_metadata of the current PlayItem. Secondary video stream number: 0 : Reserved 1 to 32 : Secondary video stream number 0xFE : Indicating that the current state is at the "Valid" state, but the Secondary video stream is not selected 0xFF : Secondary video stream is not selected, or No Secondary video stream Others : reserved Secondary audio stream number: 0 : Reserved 1 to 32 : Secondary audio stream number 0xFF : Secondary audio stream is not selected, or No Secondary audio stream Others : reserved	Playback Status
15	AudioCapability	Player Capability for Audio	Player Setting
16	AudioLanguage	Language Code for Audio	Player

		The PSR16 contains the Initial Language Code for the Audio stream. The language codes shall be according to ISO 639-2/T (Each code represents a names of language by three-character), and shall be coded according to ISO 646. 0xFFFFFFFF : Not Specified Others : Language Code	Setting
17	PGTSLanguage	Language Code for Presentation Graphics and Text subtitle The PSR17 contains the Initial Language Code for the Presentation Graphics stream and the Text subtitle stream. The language codes shall be according to ISO 639-2/T (Each code represents a names of language by three-character), and shall be coded according to ISO 646. 0xFFFFFFFF : Not Specified Others : Language Code	Player Setting
18	MenuLanguage	Language Code for Menu Description The PSR18 contains the Menu Description. The language codes shall be according to ISO 639-2/T (Each code represents a names of language by three-character), and shall be coded according to ISO 646. 0xFFFFFFFF : Not Specified Others : Language Code	Player Setting
19	Country	Country Code The PSR19 represents the Country code that is set in the BD-ROM Player. The country codes shall be according to ISO 3166-1 (Each code represents a names of country by two-character), and shall be coded according to ISO 646. 0xFFFF : Not Specified Others : Country Code	Player Setting
20	Region	Region Code The PSR20 represents the Region code of the BD-ROM Player.	Player Setting

		0000 0001_b : Region A Player 0000 0010_b : Region B Player 0000 0100_b : Region C Player Others : reserved	
21~28	-	reserved	Player Setting
29	VideoCapability	Player Capability for Video	Player Setting
30	TextCapability	Player Capability for Text Subtitle	Player Setting
31	PlayerProfileVersion	Profile / Version number Profile5 indicator: 0 :BD-ROM Player which complies with BD-ROM Profile 1, Profile 2 or Profile 3 1 :BD-ROM Player which complies with BD-ROM Profile 5. When the Profile 5 indicator value is set to 1, the Player Profile value shall be set to 0011b. Player Profile: 0000_b : BD-ROM Player which complies with BD-ROM Profile 1 without some functionality 0001_b : BD-ROM Player which complies with BD-ROM Profile 1 with all the functions 0011_b : BD-ROM Player which complies with BD-ROM Profile 2 or BD-ROM Profile 5. 1000_b : BD-ROM Player which complies with BD-ROM Profile 3 Others : Reserved Player Version: 0000 0010 0100 0000_b (0x0240) : BD-ROM Player which complies with "System Description Blu-ray Disc Read-Only Format, Part 3: Audio Visual Basic Specifications Version 2.4". Others : reserved	Player Setting
32~35	-	reserved	
36	BackupTitle	Back-up Register for PSR4	Playback Status
37	BackupChapter	Back-up Register for PSR5	Playback

			Status																																																																																																									
38	BackupPlayList	Back-up Register for PSR6	Playback Status																																																																																																									
39	BackupPlayItem	Back-up Register for PSR7	Playback Status																																																																																																									
40	BackupPresentationTime	Back-up Register for PSR8	Playback Status																																																																																																									
41	-	reserved																																																																																																										
42	BackupSelectedButton	Back-up Register for PSR10	Playback Status																																																																																																									
43	BackupMenuPage	Back-up Register for PSR11	Playback Status																																																																																																									
44	BackupSelectedStyle	Back-up Register for PSR12	Playback Status																																																																																																									
45~47	-	reserved																																																																																																										
48	CharacteristicTextCapability (48)	Player Capability for Characteristic Text Subtitle The PSR48~61 contain text subtitle capability of the BD-ROM Player for each language code defined in ISO 639-2/T (Each code represents a names of language by three-character). [PSR48] <table><tr><td>b31</td><td>b30</td><td>b29</td><td>b28</td><td>b27</td><td>b26</td><td>b25</td></tr><tr><td>abk</td><td>ace</td><td>ach</td><td>ada</td><td>aar</td><td>afh</td><td>afr</td></tr><tr><td>b23</td><td>b22</td><td>b21</td><td>b20</td><td>b19</td><td>b18</td><td>b17</td></tr><tr><td>aka</td><td>akk</td><td>sqi</td><td>ale</td><td>alg</td><td>tut</td><td>amh</td></tr><tr><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td></tr><tr><td>ara</td><td>arc</td><td>arp</td><td>arn</td><td>arw</td><td>hye</td><td>art</td></tr><tr><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td></tr><tr><td>ath</td><td>aus</td><td>map</td><td>ava</td><td>ave</td><td>aw a</td><td>aym</td></tr></table> [PSR49] <table><tr><td>b31</td><td>b30</td><td>b29</td><td>b28</td><td>b27</td><td>b26</td><td>b25</td></tr><tr><td>ban</td><td>bat</td><td>bal</td><td>bam</td><td>bai</td><td>bad</td><td>bnt</td></tr><tr><td>b23</td><td>b22</td><td>b21</td><td>b20</td><td>b19</td><td>b18</td><td>b17</td></tr><tr><td>bak</td><td>eus</td><td>btm</td><td>bej</td><td>bel</td><td>bem</td><td>ben</td></tr><tr><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td></tr><tr><td>bho</td><td>bih</td><td>bik</td><td>bin</td><td>bis</td><td>bra</td><td>bre</td></tr><tr><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td></tr></table>	b31	b30	b29	b28	b27	b26	b25	abk	ace	ach	ada	aar	afh	afr	b23	b22	b21	b20	b19	b18	b17	aka	akk	sqi	ale	alg	tut	amh	b15	b14	b13	b12	b11	b10	b9	ara	arc	arp	arn	arw	hye	art	b7	b6	b5	b4	b3	b2	b1	ath	aus	map	ava	ave	aw a	aym	b31	b30	b29	b28	b27	b26	b25	ban	bat	bal	bam	bai	bad	bnt	b23	b22	b21	b20	b19	b18	b17	bak	eus	btm	bej	bel	bem	ben	b15	b14	b13	b12	b11	b10	b9	bho	bih	bik	bin	bis	bra	bre	b7	b6	b5	b4	b3	b2	b1	Player Setting
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		bul	bua	mya	cad	car	cat	cau	
		[PSR50]							
		b31	b30	b29	b28	b27	b26	b25	
		cel	cai	chg	cmc	cha	che	chr	
		b23	b22	b21	b20	b19	b18	b17	
		chb	zho	chn	chp	cho	chu	chk	
		b15	b14	b13	b12	b11	b10	b9	
		cop	cor	cos	cre	mus	crp	cpe	
		b7	b6	b5	b4	b3	b2	b1	
		cpp	hrv	cus	ces	dak	dan	day	
		[PSR51]							
		b31	b30	b29	b28	b27	b26	b25	
		din	div	doi	dgr	dra	dua	nld	
		b23	b22	b21	b20	b19	b18	b17	
		dyu	dzo	efi	egy	eka	alx	eng	
		b15	b14	b13	b12	b11	b10	b9	
		ang	epo	est	ewe	ewo	fan	fat	
		b7	b6	b5	b4	b3	b2	b1	
		fij	fin	fiu	fon	fra	frm	fro	
		[PSR52]							
		b31	b30	b29	b28	b27	b26	b25	
		fur	ful	gaa	gla	glg	lug	gay	
		b23	b22	b21	b20	b19	b18	b17	
		gez	kat	deu	gmh	goh	gem	gil	
		b15	b14	b13	b12	b11	b10	b9	
		gor	got	grb	grc	ell	grn	guj	
		b7	b6	b5	b4	b3	b2	b1	
		hai	hau	haw	heb	her	hil	him	
		[PSR53]							
		b31	b30	b29	b28	b27	b26	b25	
		hmo	hit	hmn	hun	hup	iba	isl	
		b23	b22	b21	b20	b19	b18	b17	
		ijo	ilo	inc	ine	ind	ina	ile	
		b15	b14	b13	b12	b11	b10	b9	
		ipk	ira	gle	mga	sga	iro	ita	

		b7	b6	b5	b4	b3	b2	b1
		jaw	jrb	jpr	kab	kac	kal	kam
		[PSR54]						
		b31	b30	b29	b28	b27	b26	b25
		kau	kaa	kar	kas	kaw	kaz	kha
		b23	b22	b21	b20	b19	b18	b17
		khi	kho	kik	kmb	kin	kir	kom
		b15	b14	b13	b12	b11	b10	b9
		kok	kor	kos	kpe	kro	kua	kum
		b7	b6	b5	b4	b3	b2	b1
		kru	kut	lad	lah	lam	lao	lat
		[PSR55]						
		b31	b30	b29	b28	b27	b26	b25
		ltz	lez	lin	lit	loz	lub	lua
		b23	b22	b21	b20	b19	b18	b17
		lun	luo	lus	mkd	mad	mag	mai
		b15	b14	b13	b12	b11	b10	b9
		mlg	msa	mal	mlt	mdr	man	mni
		b7	b6	b5	b4	b3	b2	b1
		glv	mri	mar	chm	mah	mw r	mas
		[PSR56]						
		b31	b30	b29	b28	b27	b26	b25
		men	mic	min	mis	moh	mol	mkh
		b23	b22	b21	b20	b19	b18	b17
		mon	mos	mul	mun	nah	nau	nav
		b15	b14	b13	b12	b11	b10	b9
		nbl	ndo	nep	new	nia	nic	ssa
		b7	b6	b5	b4	b3	b2	b1
		non	nai	nor	nub	nym	nya	nyn
		[PSR57]						
		b31	b30	b29	b28	b27	b26	b25
		nzi	oci	oji	ori	orm	osa	oss
		b23	b22	b21	b20	b19	b18	b17
		pal	pau	pli	pam	pag	pan	pap
		b15	b14	b13	b12	b11	b10	b9
		fas	peo	phi	phn	pon	pol	por

			<table><tr><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td></tr><tr><td>pro</td><td>pus</td><td>que</td><td>roh</td><td>raj</td><td>rap</td><td>rar</td></tr></table>	b7	b6	b5	b4	b3	b2	b1	pro	pus	que	roh	raj	rap	rar
			b7	b6	b5	b4	b3	b2	b1								
			pro	pus	que	roh	raj	rap	rar								
			[PSR58]														
			<table><tr><td>b31</td><td>b30</td><td>b29</td><td>b28</td><td>b27</td><td>b26</td><td>b25</td></tr><tr><td>ron</td><td>rom</td><td>run</td><td>rus</td><td>sal</td><td>sam</td><td>smi</td></tr></table>	b31	b30	b29	b28	b27	b26	b25	ron	rom	run	rus	sal	sam	smi
			b31	b30	b29	b28	b27	b26	b25								
			ron	rom	run	rus	sal	sam	smi								
			<table><tr><td>b23</td><td>b22</td><td>b21</td><td>b20</td><td>b19</td><td>b18</td><td>b17</td></tr><tr><td>sad</td><td>sag</td><td>san</td><td>sat</td><td>srd</td><td>sas</td><td>sco</td></tr></table>	b23	b22	b21	b20	b19	b18	b17	sad	sag	san	sat	srd	sas	sco
			b23	b22	b21	b20	b19	b18	b17								
			sad	sag	san	sat	srd	sas	sco								
<table><tr><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td></tr><tr><td>sem</td><td>srp</td><td>srr</td><td>shn</td><td>sna</td><td>sid</td><td>bla</td></tr></table>	b15	b14	b13	b12	b11	b10	b9	sem	srp	srr	shn	sna	sid	bla			
b15	b14	b13	b12	b11	b10	b9											
sem	srp	srr	shn	sna	sid	bla											
<table><tr><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td></tr><tr><td>sin</td><td>sit</td><td>sio</td><td>den</td><td>sla</td><td>slk</td><td>slv</td></tr></table>	b7	b6	b5	b4	b3	b2	b1	sin	sit	sio	den	sla	slk	slv			
b7	b6	b5	b4	b3	b2	b1											
sin	sit	sio	den	sla	slk	slv											
[PSR59]																	
<table><tr><td>b31</td><td>b30</td><td>b29</td><td>b28</td><td>b27</td><td>b26</td><td>b25</td></tr><tr><td>som</td><td>son</td><td>snk</td><td>w en</td><td>nso</td><td>sot</td><td>sai</td></tr></table>	b31	b30	b29	b28	b27	b26	b25	som	son	snk	w en	nso	sot	sai			
b31	b30	b29	b28	b27	b26	b25											
som	son	snk	w en	nso	sot	sai											
<table><tr><td>b23</td><td>b22</td><td>b21</td><td>b20</td><td>b19</td><td>b18</td><td>b17</td></tr><tr><td>suk</td><td>sux</td><td>sun</td><td>sus</td><td>sw a</td><td>ssw</td><td>sw</td></tr></table>	b23	b22	b21	b20	b19	b18	b17	suk	sux	sun	sus	sw a	ssw	sw			
b23	b22	b21	b20	b19	b18	b17											
suk	sux	sun	sus	sw a	ssw	sw											
<table><tr><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td></tr><tr><td>tgl</td><td>tah</td><td>tai</td><td>tgk</td><td>tmh</td><td>tam</td><td>tat</td></tr></table>	b15	b14	b13	b12	b11	b10	b9	tgl	tah	tai	tgk	tmh	tam	tat			
b15	b14	b13	b12	b11	b10	b9											
tgl	tah	tai	tgk	tmh	tam	tat											
<table><tr><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td></tr><tr><td>ter</td><td>tet</td><td>tha</td><td>bod</td><td>tig</td><td>tir</td><td>tem</td></tr></table>	b7	b6	b5	b4	b3	b2	b1	ter	tet	tha	bod	tig	tir	tem			
b7	b6	b5	b4	b3	b2	b1											
ter	tet	tha	bod	tig	tir	tem											
[PSR60]																	
<table><tr><td>b31</td><td>b30</td><td>b29</td><td>b28</td><td>b27</td><td>b26</td><td>b25</td></tr><tr><td>tli</td><td>tpi</td><td>tkl</td><td>tog</td><td>ton</td><td>tsi</td><td>tso</td></tr></table>	b31	b30	b29	b28	b27	b26	b25	tli	tpi	tkl	tog	ton	tsi	tso			
b31	b30	b29	b28	b27	b26	b25											
tli	tpi	tkl	tog	ton	tsi	tso											
<table><tr><td>b23</td><td>b22</td><td>b21</td><td>b20</td><td>b19</td><td>b18</td><td>b17</td></tr><tr><td>tum</td><td>tur</td><td>ota</td><td>tuk</td><td>tvI</td><td>tyv</td><td>tw i</td></tr></table>	b23	b22	b21	b20	b19	b18	b17	tum	tur	ota	tuk	tvI	tyv	tw i			
b23	b22	b21	b20	b19	b18	b17											
tum	tur	ota	tuk	tvI	tyv	tw i											
<table><tr><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td></tr><tr><td>uig</td><td>ukr</td><td>umb</td><td>und</td><td>urd</td><td>uzb</td><td>vai</td></tr></table>	b15	b14	b13	b12	b11	b10	b9	uig	ukr	umb	und	urd	uzb	vai			
b15	b14	b13	b12	b11	b10	b9											
uig	ukr	umb	und	urd	uzb	vai											
<table><tr><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td></tr><tr><td>vie</td><td>vol</td><td>vot</td><td>w ak</td><td>w al</td><td>w ar</td><td>was</td></tr></table>	b7	b6	b5	b4	b3	b2	b1	vie	vol	vot	w ak	w al	w ar	was			
b7	b6	b5	b4	b3	b2	b1											
vie	vol	vot	w ak	w al	w ar	was											
[PSR61]																	
<table><tr><td>b31</td><td>b30</td><td>b29</td><td>b28</td><td>b27</td><td>b26</td><td>b25</td></tr><tr><td>w ol</td><td>xho</td><td>sah</td><td>yao</td><td>yap</td><td>yid</td><td>yor</td></tr></table>	b31	b30	b29	b28	b27	b26	b25	w ol	xho	sah	yao	yap	yid	yor			
b31	b30	b29	b28	b27	b26	b25											
w ol	xho	sah	yao	yap	yid	yor											
<table><tr><td>b23</td><td>b22</td><td>b21</td><td>b20</td><td>b19</td><td>b18</td><td>b17</td></tr></table>	b23	b22	b21	b20	b19	b18	b17										
b23	b22	b21	b20	b19	b18	b17											

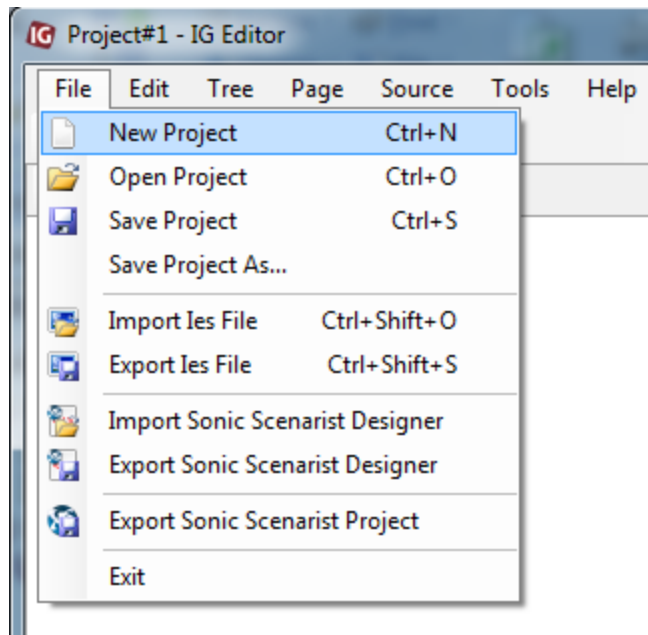
		<table><tr><td>znd</td><td>zap</td><td>zen</td><td>zha</td><td>zul</td><td>zun</td><td></td></tr><tr><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td></tr></table> (Language Code): 0 : Text subtitle corresponding language code is incapable on the BD-ROM Player 1 : Text subtitle corresponding language code is capable on the BD-ROM Player	znd	zap	zen	zha	zul	zun		b15	b14	b13	b12	b11	b10	b9								b7	b6	b5	b4	b3	b2	b1	
znd	zap	zen	zha	zul	zun																										
b15	b14	b13	b12	b11	b10	b9																									
b7	b6	b5	b4	b3	b2	b1																									
49	CharacteristicTextCapability (49)																														
50	CharacteristicTextCapability (50)																														
51	CharacteristicTextCapability (51)																														
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61	CharacteristicTextCapability (61)																														
62~95	-	reserved																													
96~111	reserved for BD system use	reserved for BD system use																													
112~127	-	reserved																													

5 How to Create new IES:

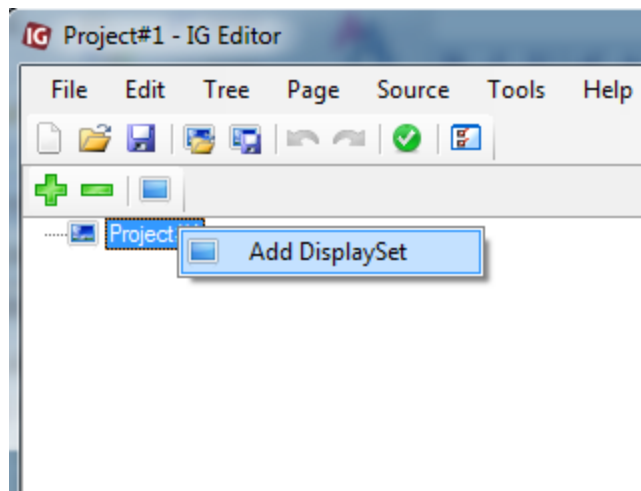
5.1 1. Create new empty IES

1. Create new empty IES

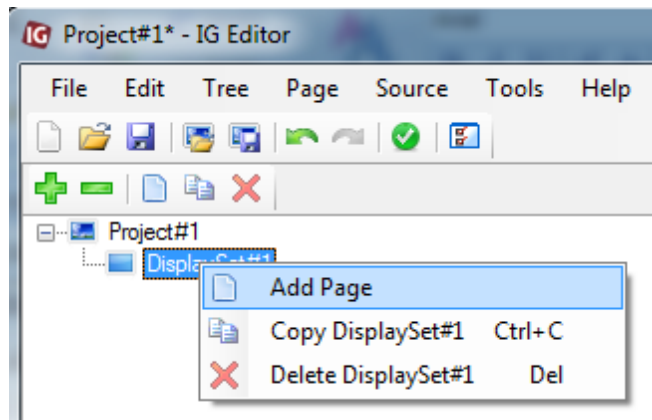
1. Create new Project through main menu "File"-">"New Project"



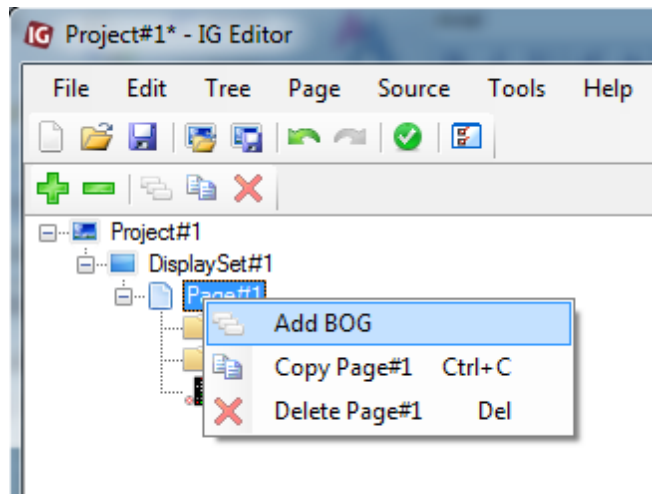
2. We can see the new project in tree then. Using popup menu or button on Toolbar we can add DisplaySet.



3. We can see new DisplaySet in tree. Select it and through popup menu or Toolbar we can add at least one Page. You can also add several Pages.



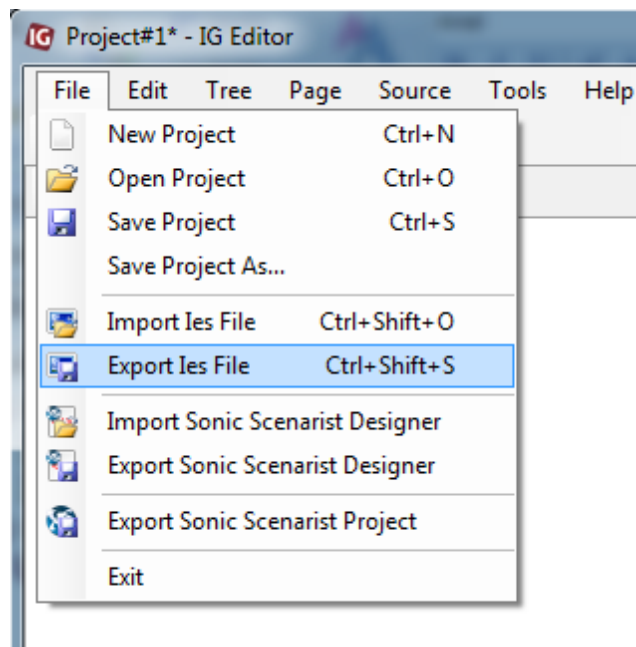
4. We can see the new Page in tree. Select it and through popup menu or Toolbar button we can add new Buttons Group "BOG". You can add "BOG" for every button.



[Description how to add new button is here...](#)

[Description how to add new navigation commands is here...](#)

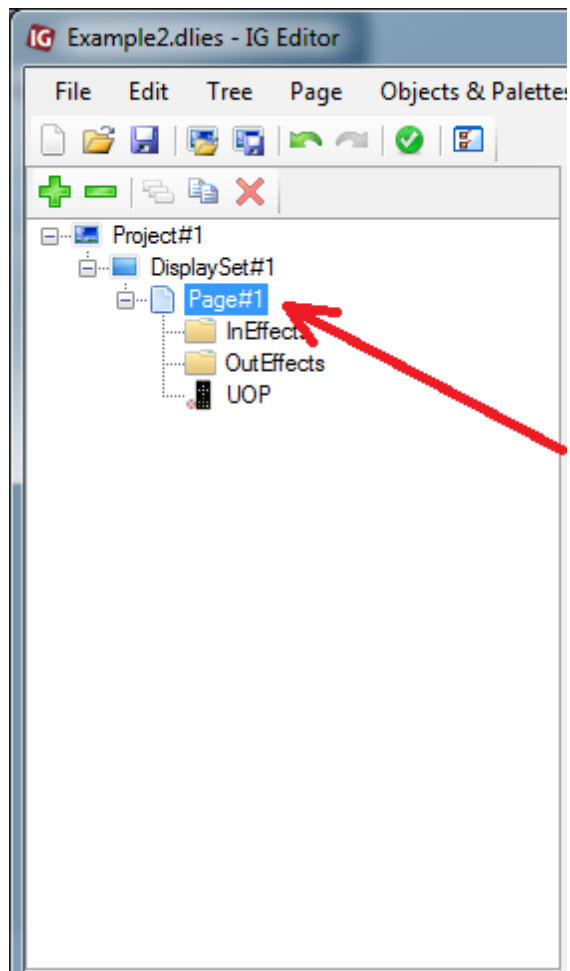
5. After Interactive Menu creation we need to create IES file. Use main menu "File"->"Export les File".



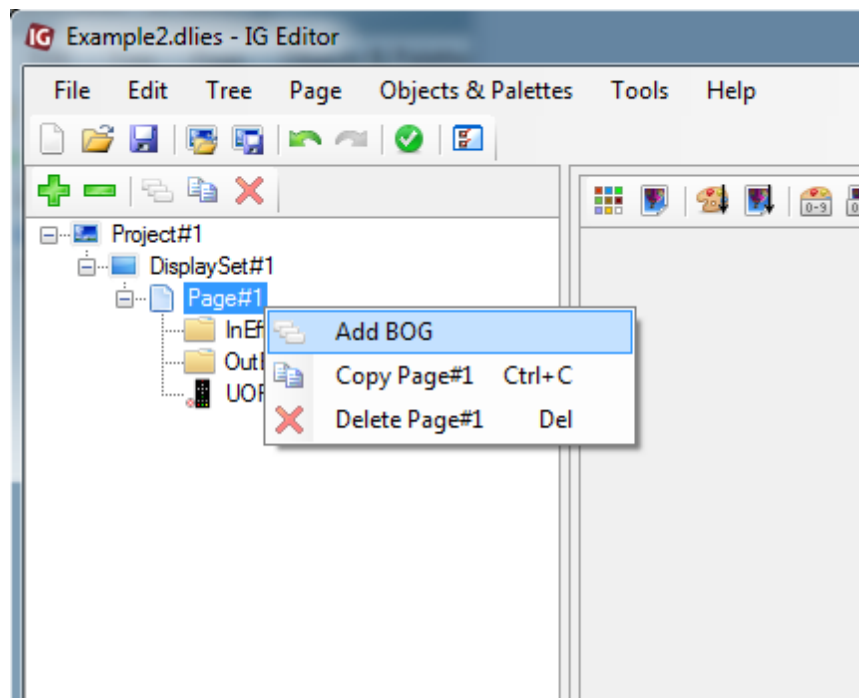
5.2 2. Add new button

2. Add new button to existing IES

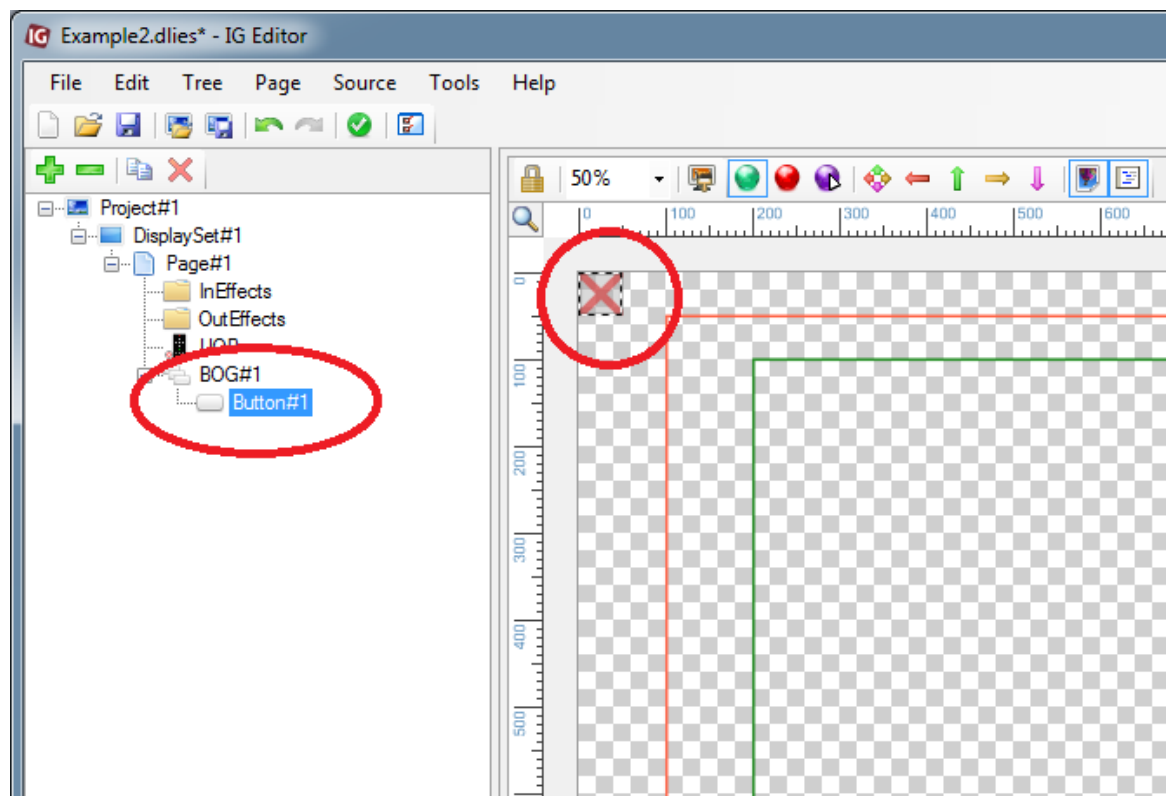
1. Select needed Page in Explorer Tree.



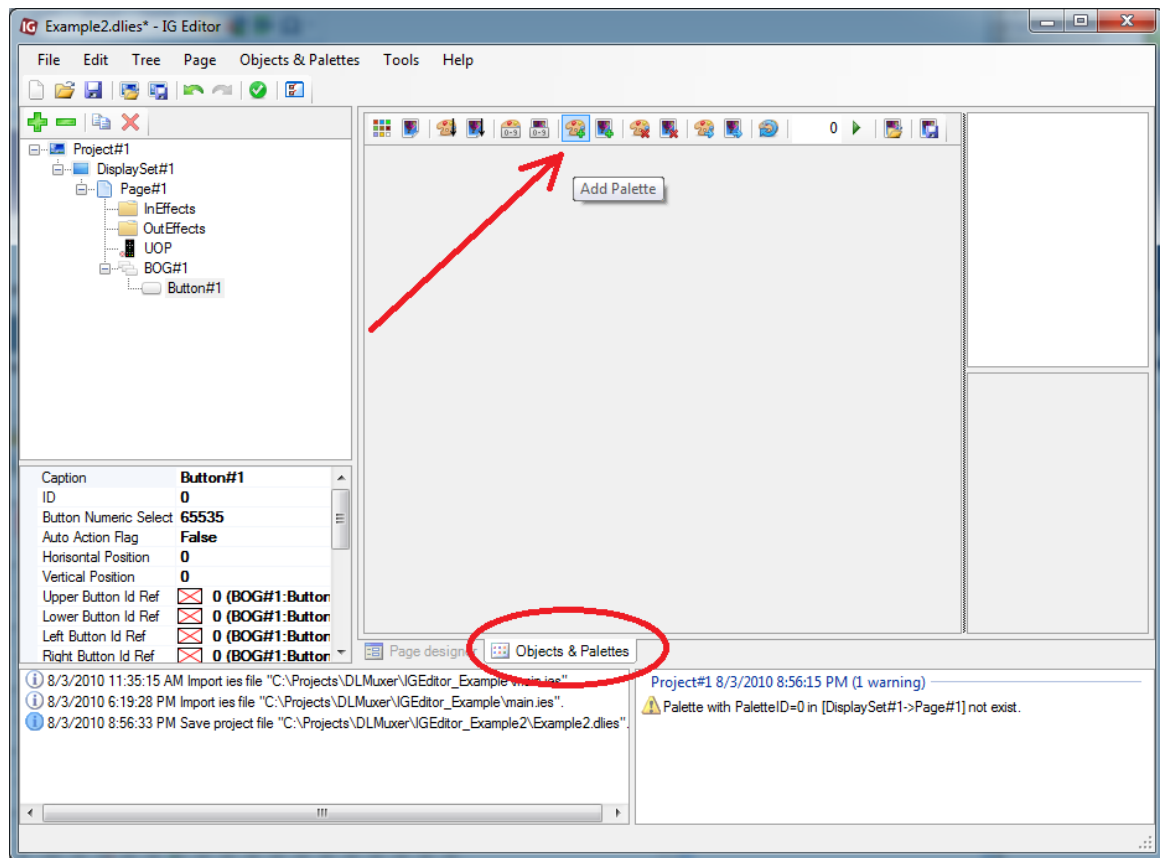
2. Add new Button Group (BOG) through popup menu or toolbar button.



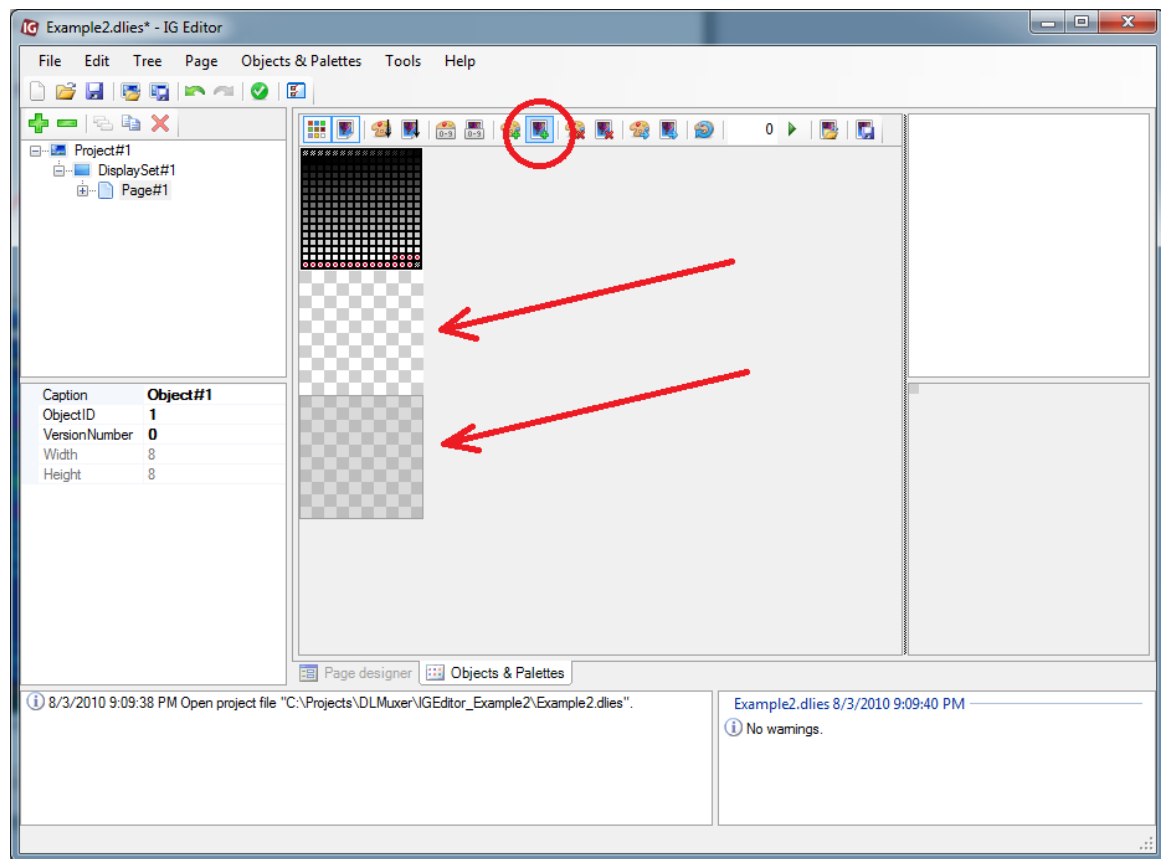
3. We can see new button in Project Explorer Tree and in Page Designer.



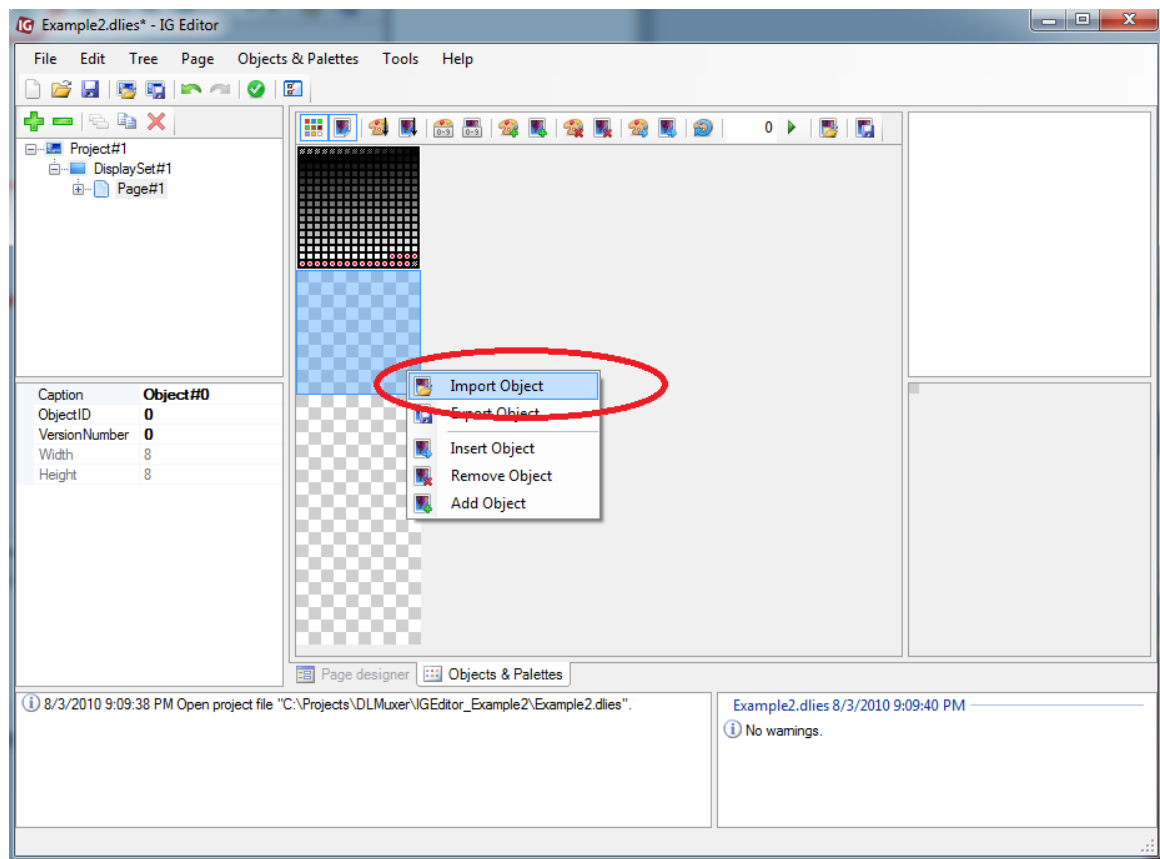
4. Adding button images. Go to "Objects and Palettes" Tab and click on "Add Palette" button in toolbar.



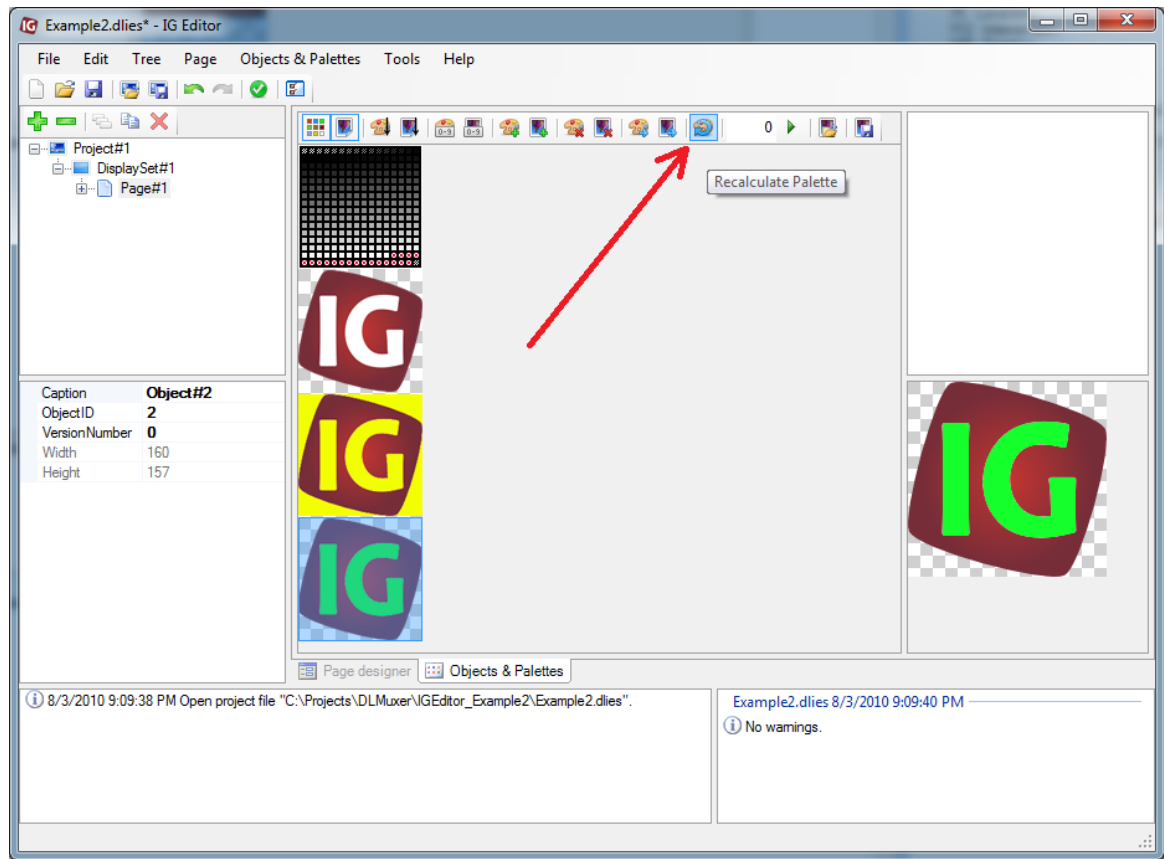
5. We can see new palette. Now we need to click on "Add Object" button 3 times in toolbar. We need to add 3 objects because for 3 possible states: normal, activated and selected.



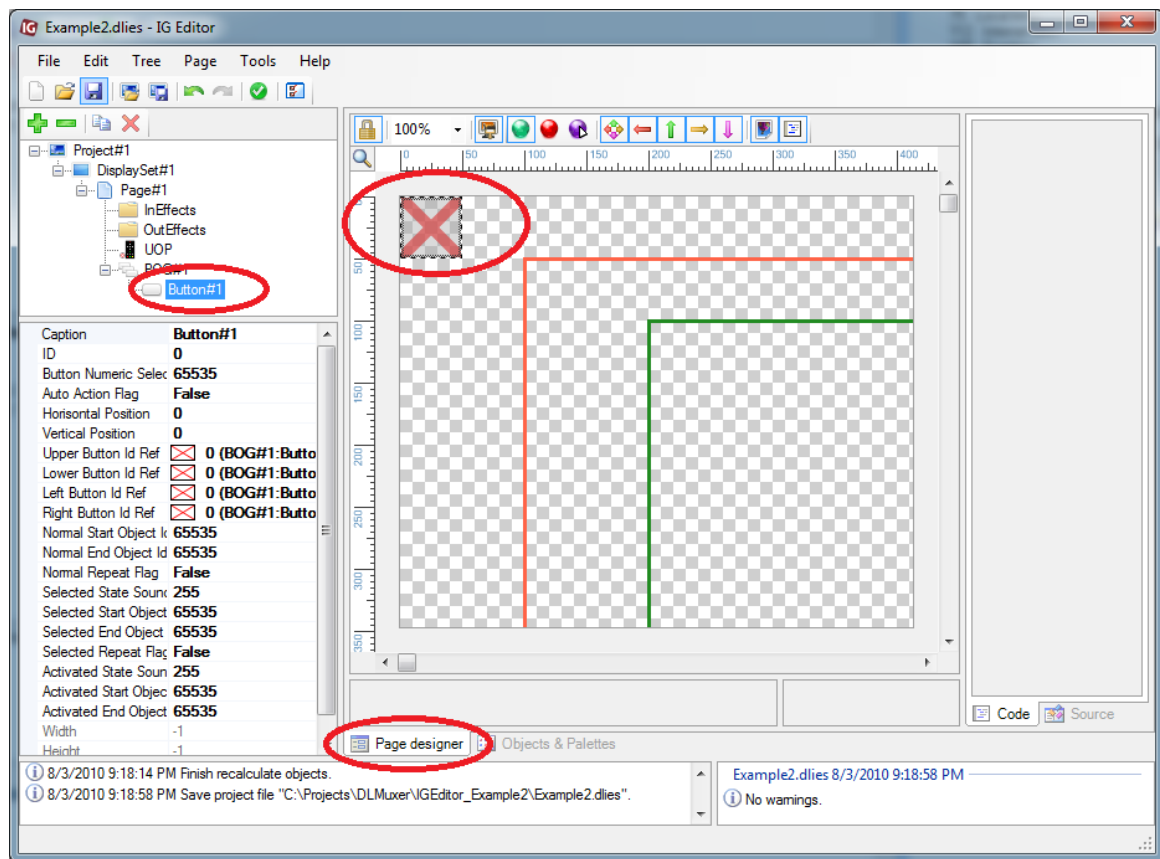
6. Adding 3 images to 3 objects from files through popup menu "Import Object".



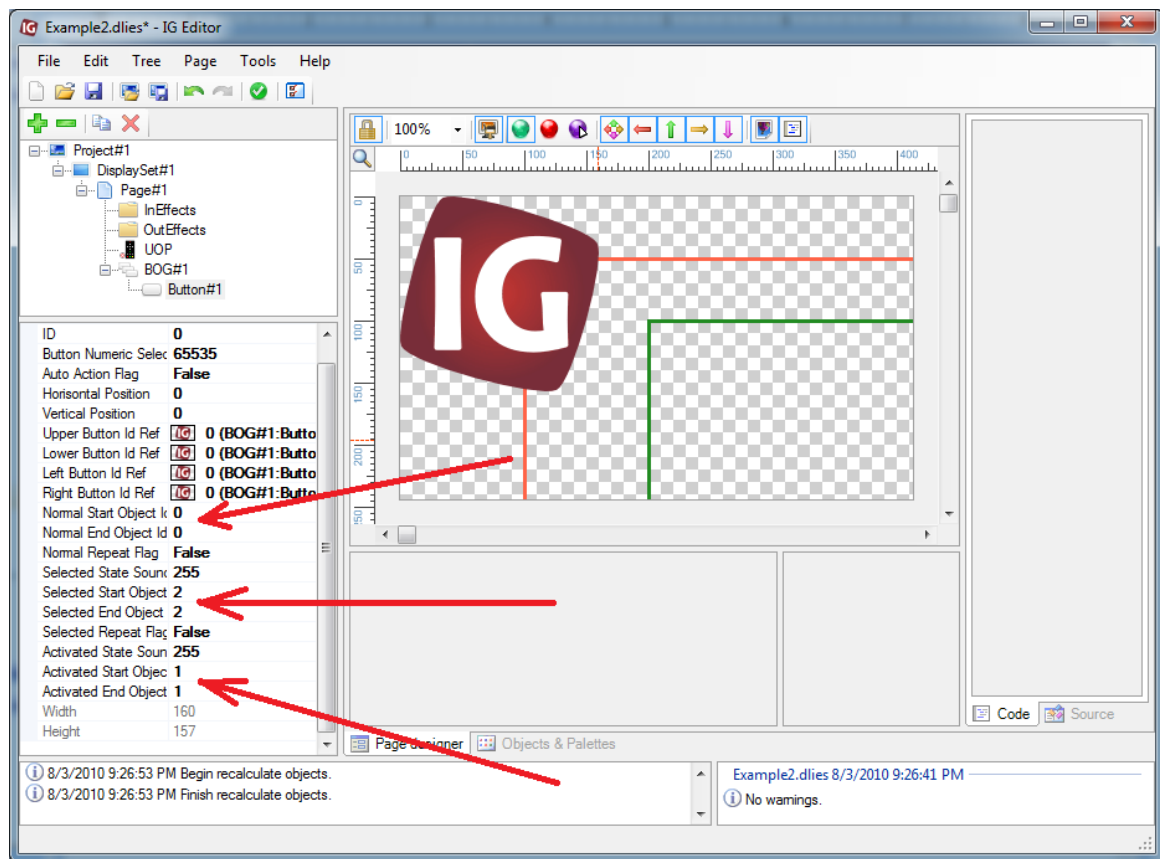
7. We can see our 3 images now. But we need to re-calculate palette to add new colors to our empty palette. Click on "Recalculate Palette" on toolbar.



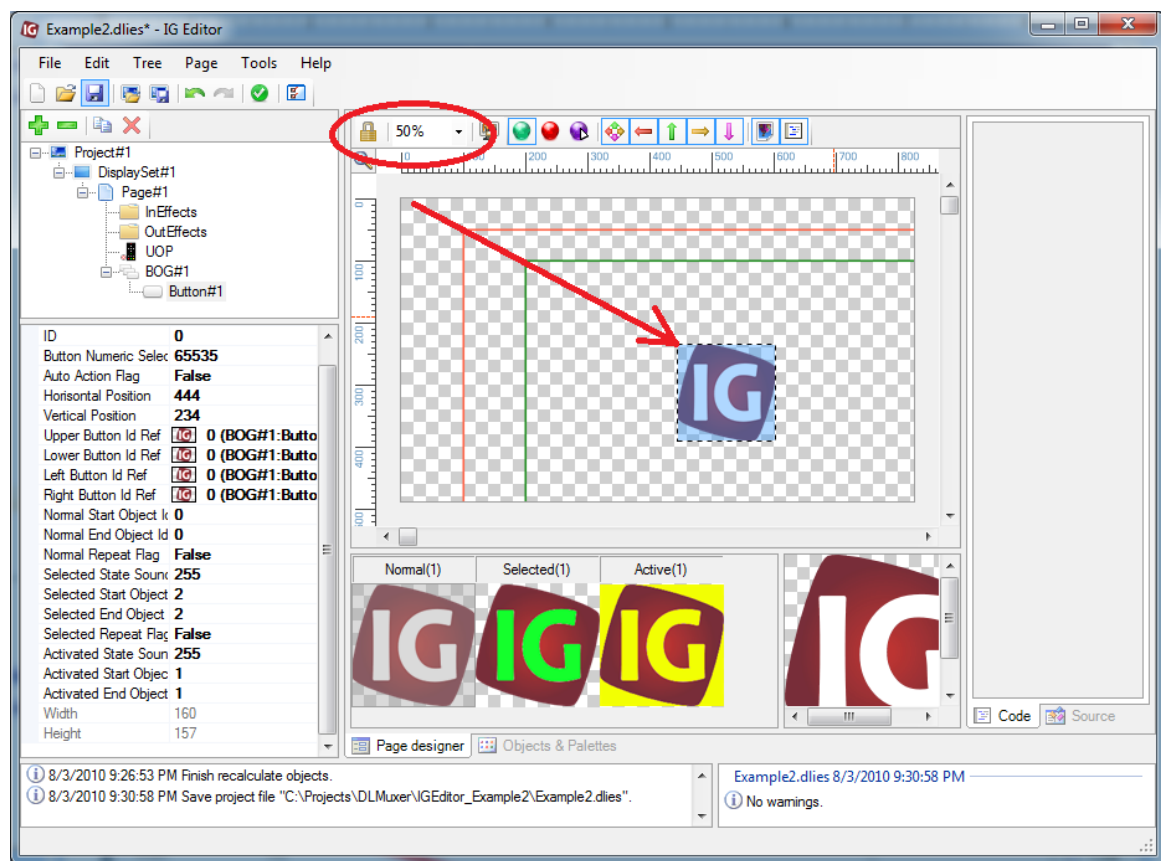
8. Go To Page Designer. And select our button in Project Explorer Tree. We can see empty button in Page Designer. Also we see values 65535 in Property Editor for current button in fields "Normal Start Object", "Normal End Object", the same value for Selected and Activated.



9. Change fields "Normal", "Selected" and "Activated" for our just added Object IDs. If button image does not appeared then go to "Object and Palettes" tab and click once again on toolbar button "Recalculate Palette".



10. After we uncheck lock button on toolbar we can move our button to the center of Page Designer. Or you can specify any location manually in "Horizontal Position" and "Vertical Position" in Property Editor.

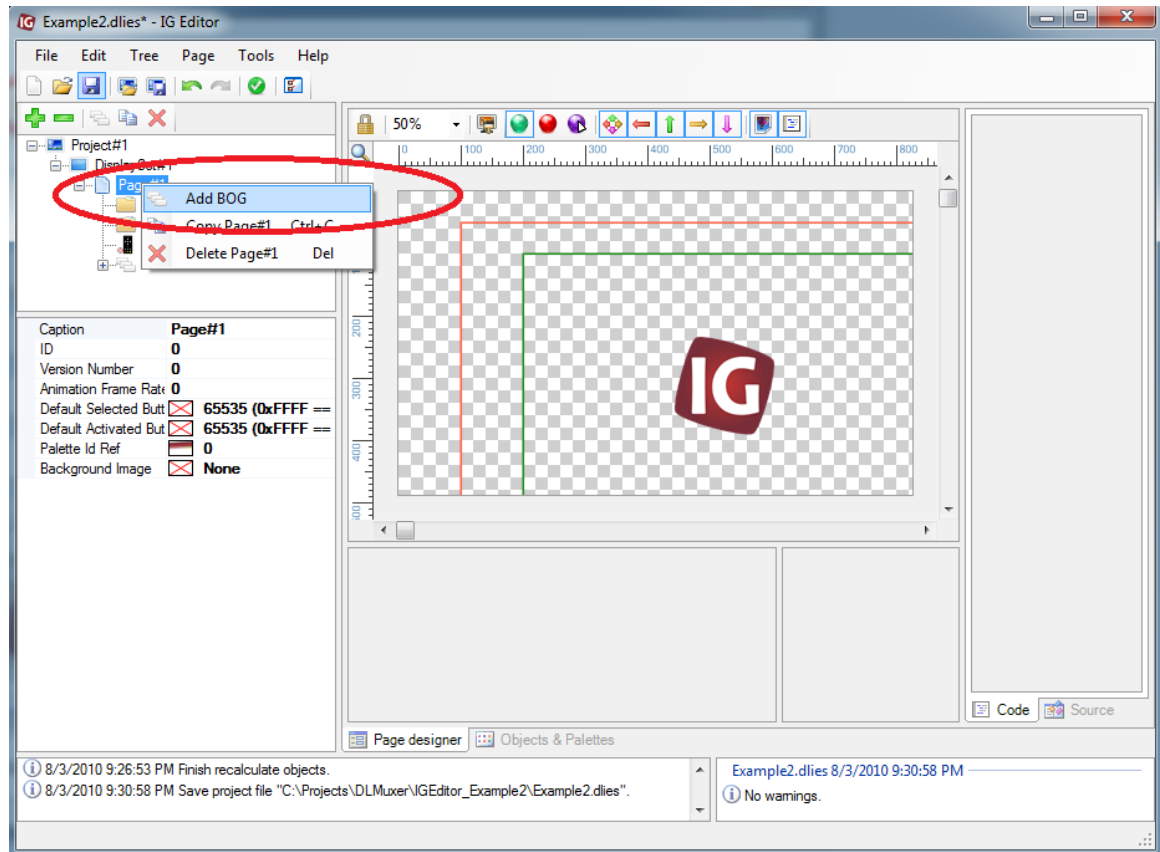


We can go to "Source" Panel later and write any navigation commands for button behaviour after clicking.

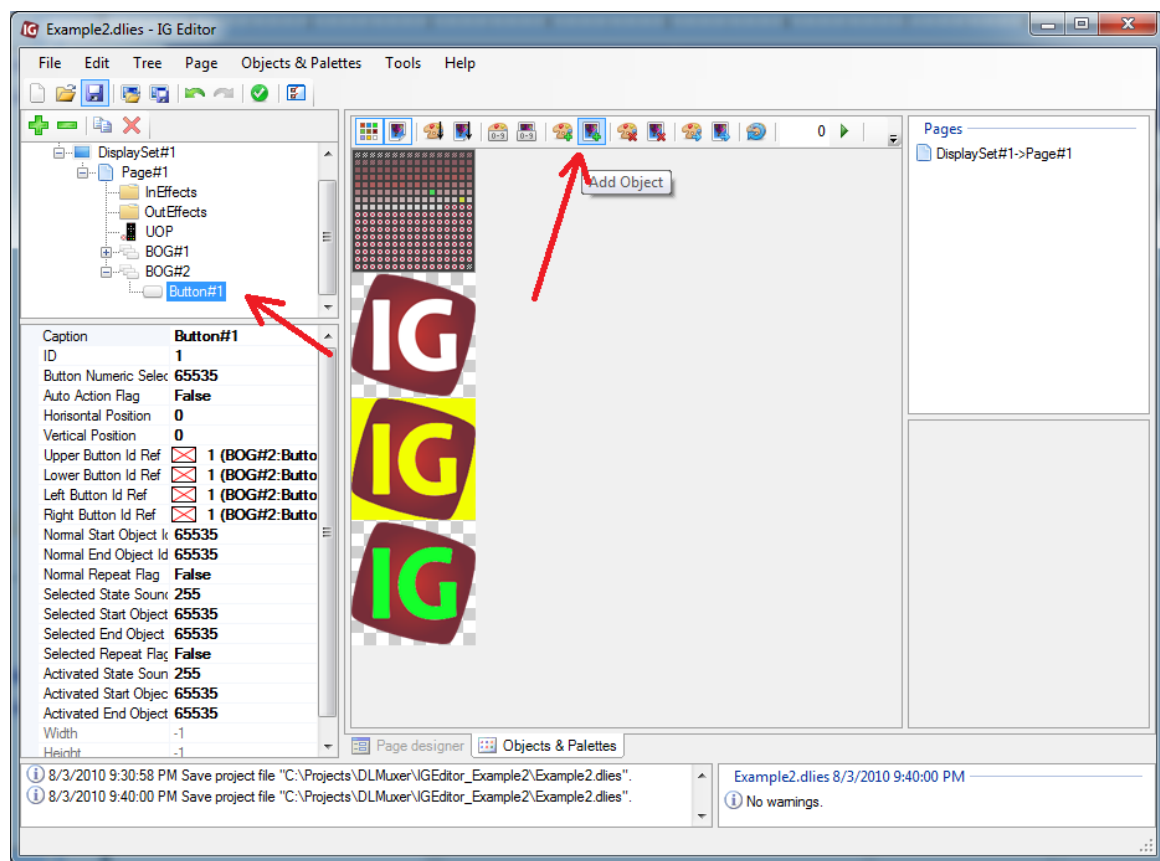
5.3 3. Add second button

3. Add second button

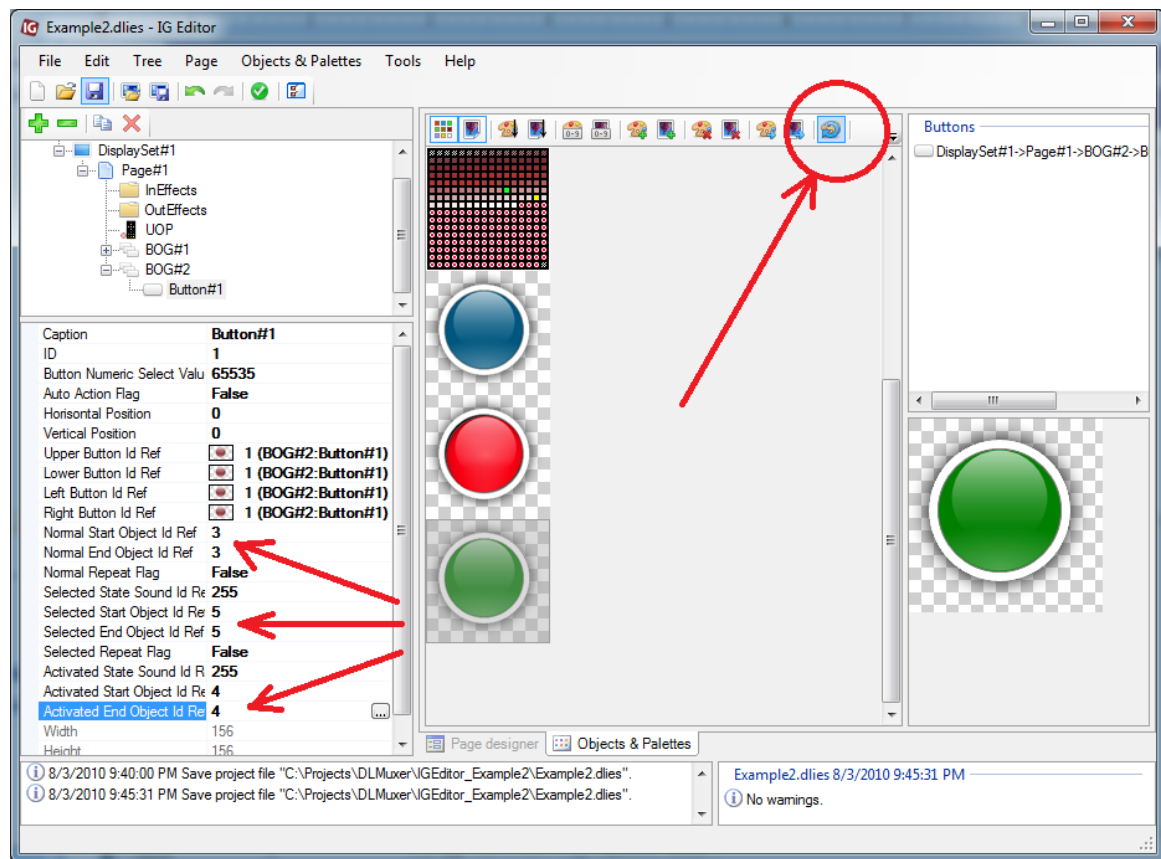
1. Select Page in Project Explorer tree and add new BOG using popup menu "Add BOG".



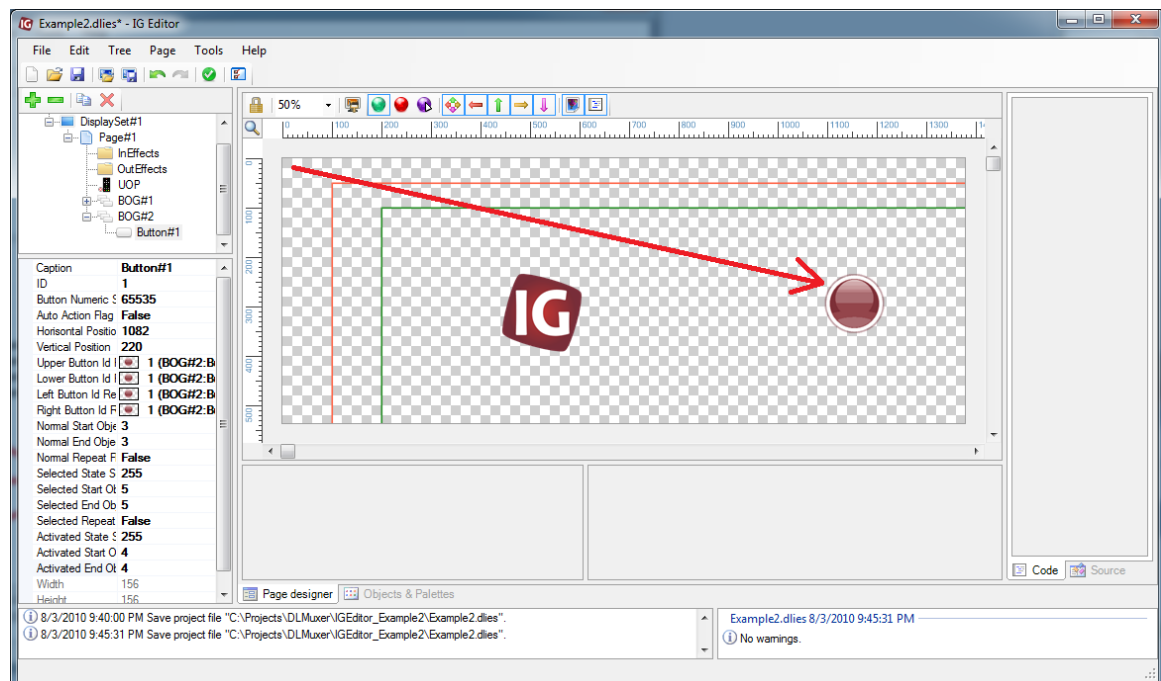
2. You can see new Button in the just added BOG. Go to "Objects and Palettes" Tab and click on "Add Object" 3 times for 3 states - normal, activated and selected.



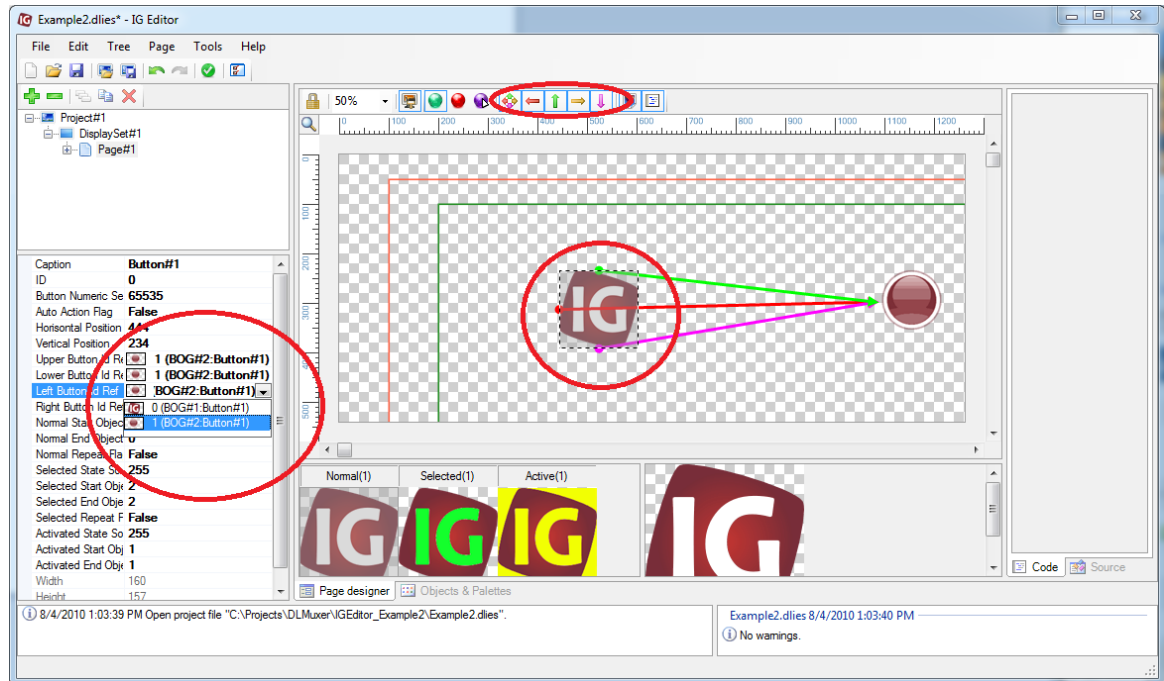
3. Import images from file accordingly to these 3 new objects. Then go to Property Editor and change Object ID references and click on "Recalculate Palette".



4. Go to Page Designer tab. You can see your new button in the upper left corner. You can also move it by mouse to any new position.



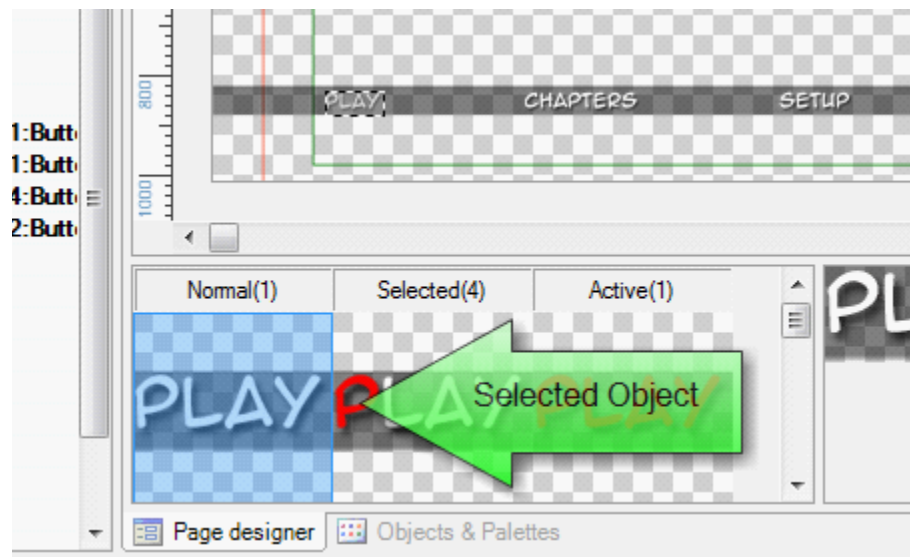
5. Now we need to set links between this two buttons. That mean when focus will go after user click Left/Right/Up/Down on remote control while playback the interactive menu. We will set all directions to second button from first and accordingly all links to first button from second. IGEEditor show arrows for every direction from one button to another. You can disable the arrows clicking on special buttons on toolbar.



5.4 4. Change button image

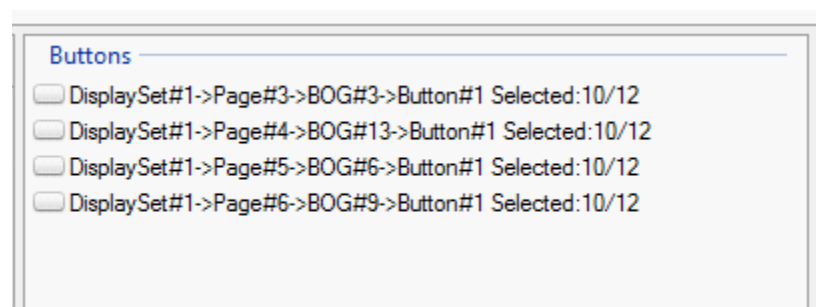
4. Change button image

Describe sequence of actions that need for changing button object. At first, select button of Page Editor. You'll see objects related of selected button of Object Panel. And then choose object for replacement.



After double clicking on selected object or pressing button Enter we move to tab «Objects & Palettes» automatically. Doing that, cell in the table according to choosing object and page's palette from this button will be selected.

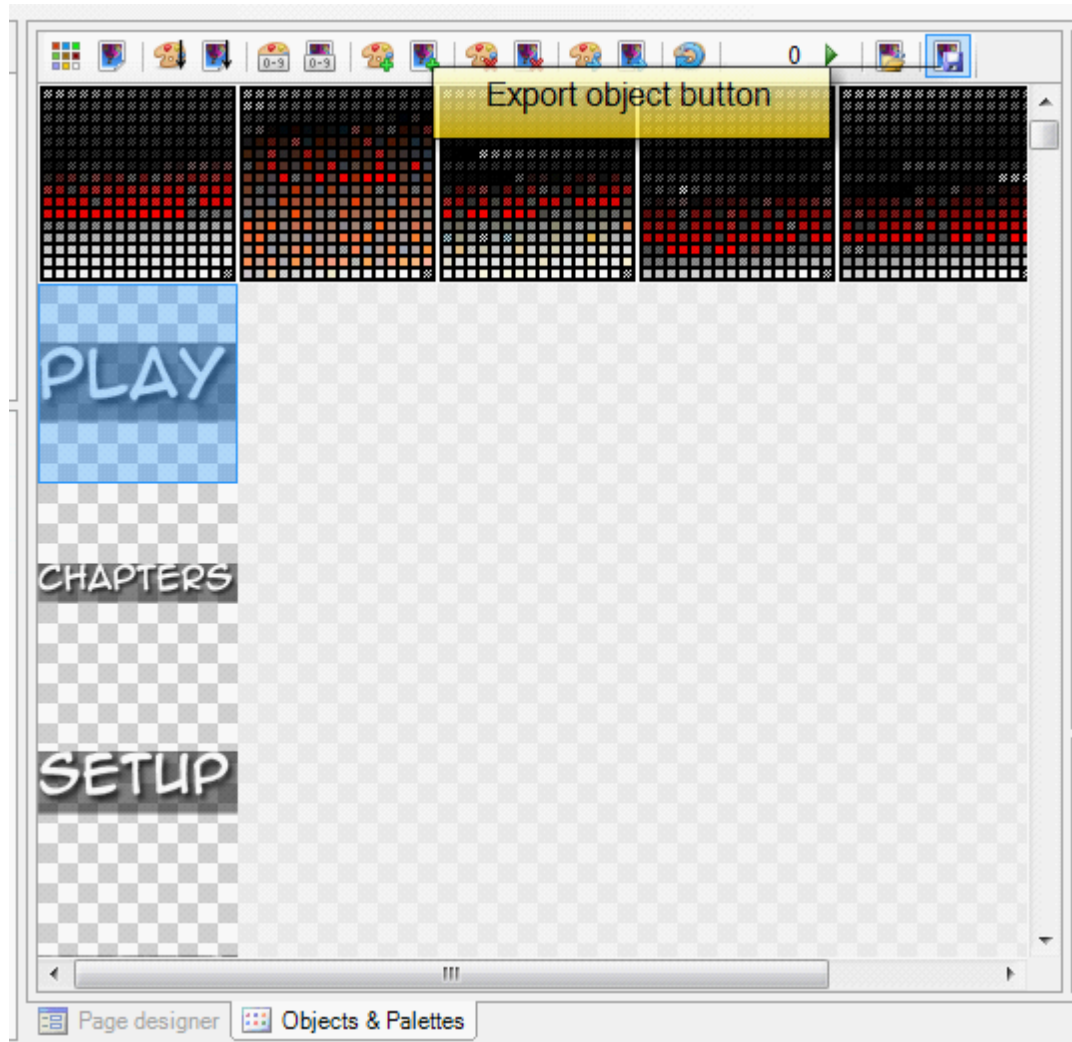
Please, pay attention to selected which can be not from current button but also Composition object and other button. Elements related of selected object reflect in the top left corner of toolbar of tab «Objects & Palettes».



The list of related elements doesn't depend on object and palette. That's why all cells of the one row table have the same list.

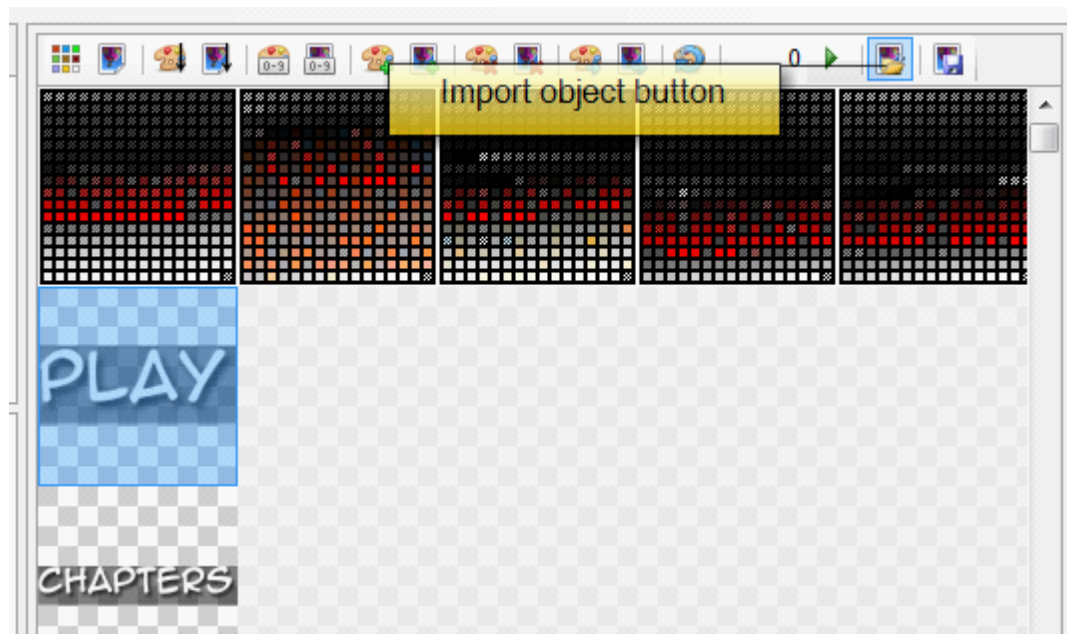
Let's say, we'd like edit existent object of external graph editor. Save it as 32 bits PNG file pressing

button «Export object». After appearing dialogs for saving file select name and path for PNG file.

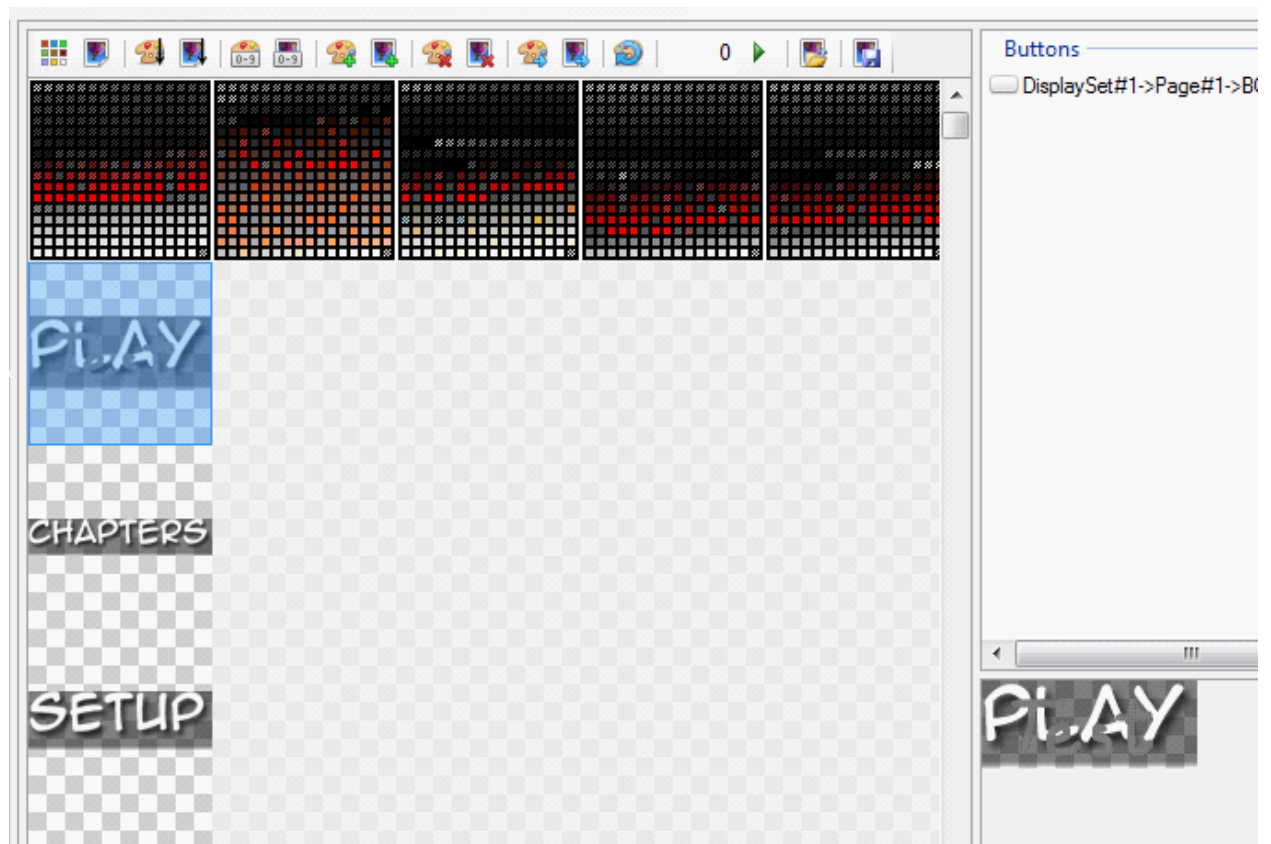


Object is presented two-dimensional table with indicated cells as color palette's index from 0 till 255. That is why object without any relation of the palette isn't displayed picture. The same object with different palettes can be displayed different pictures. During saving PNG file for final picture use palette from column current cell.

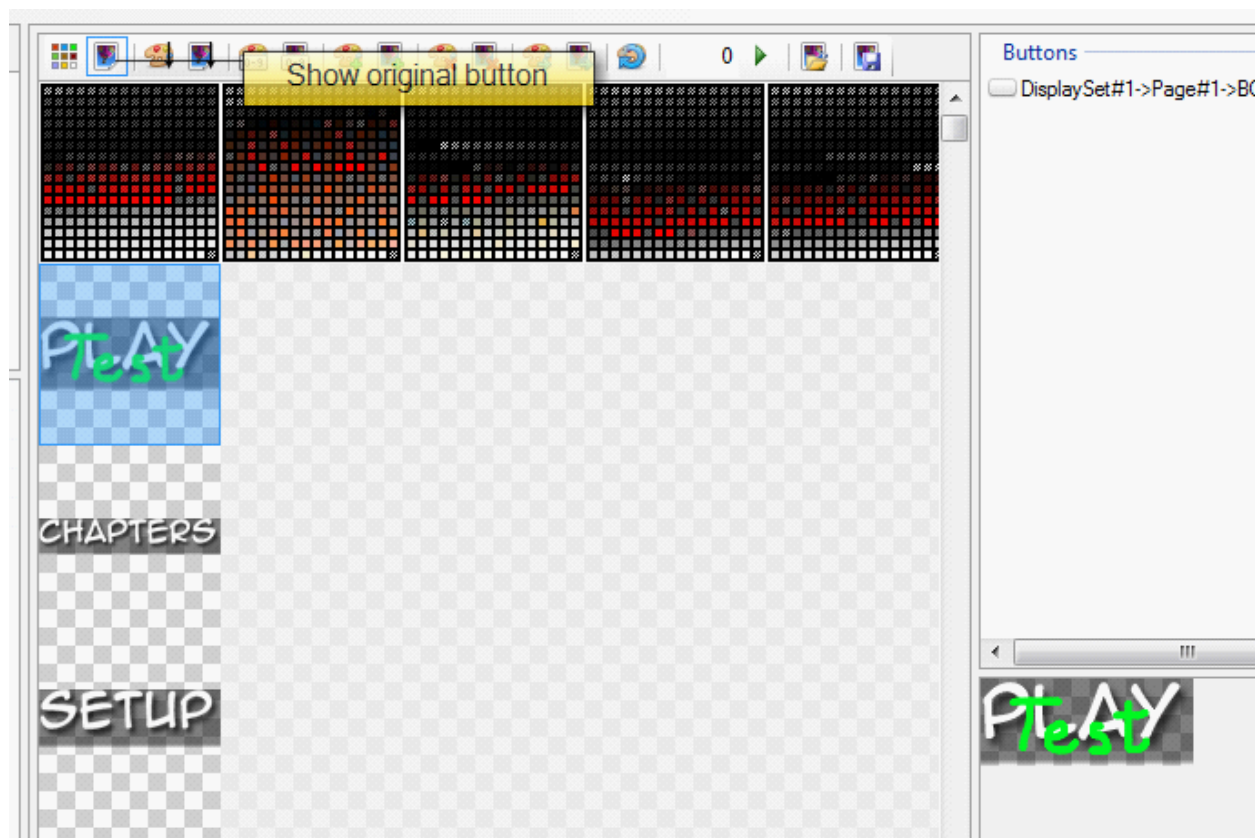
After changing PNG file of external graph editor we can download this file on our object's place. Use button «Import object» for doing that.

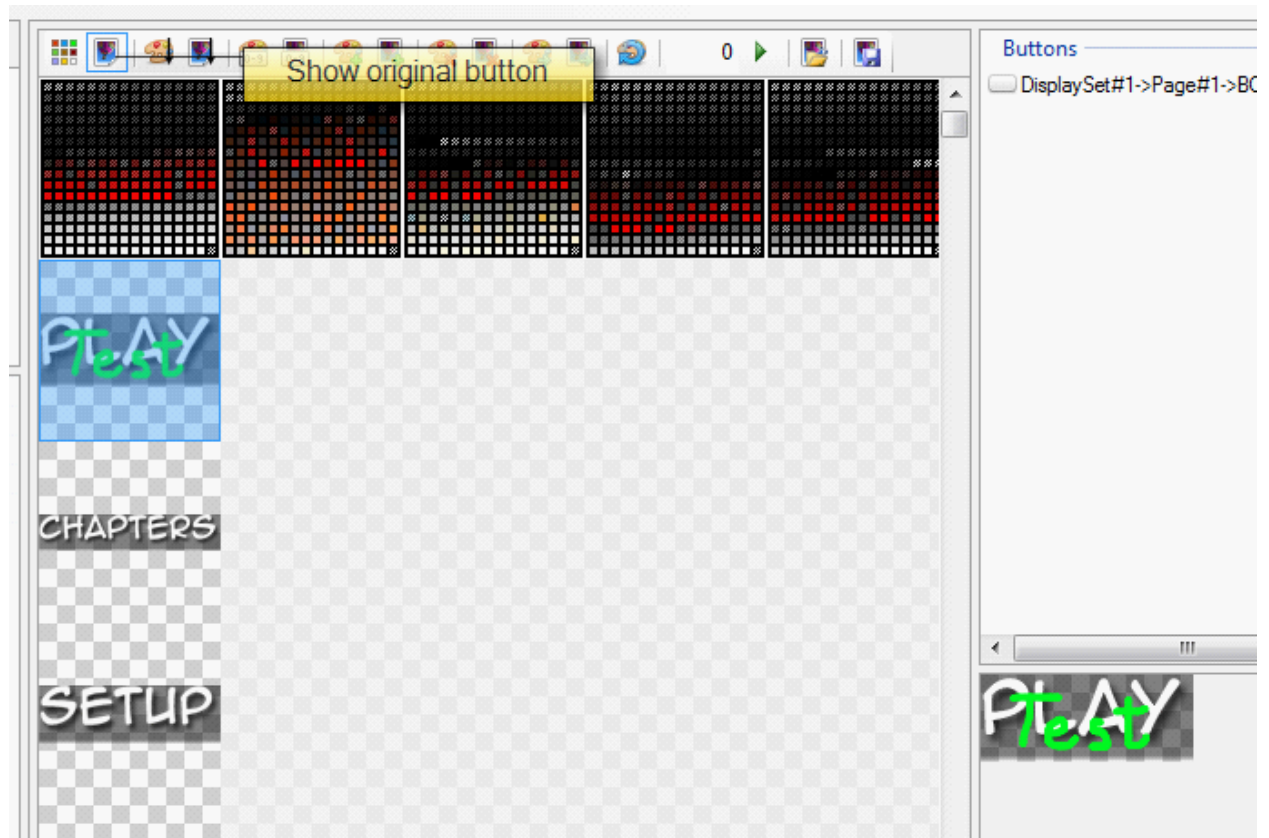


In dialogue opening file choose our edited PNG file. Opening image file will be automatically adapted according current palette as choosing every pixel of image maximal closer to color of the palette.

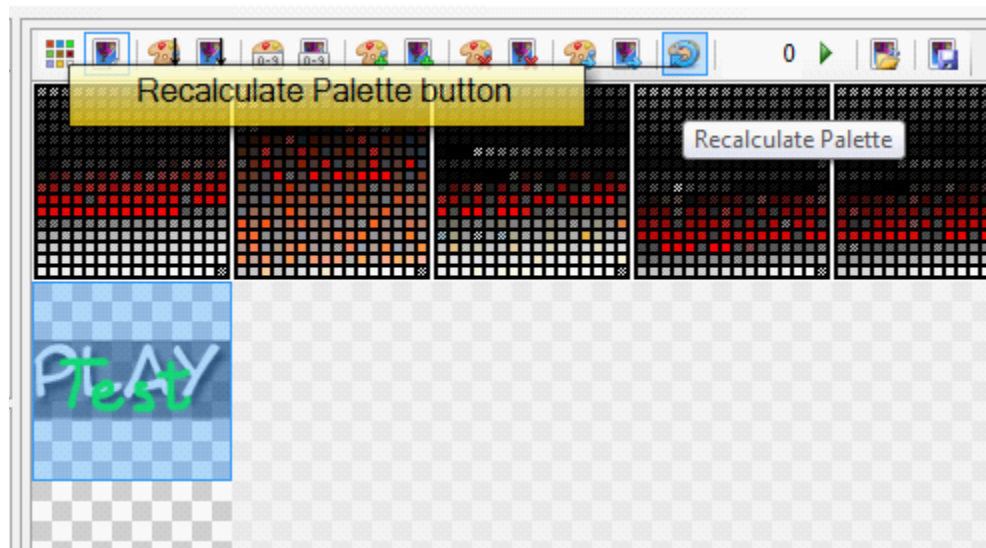


Palette may unfit edited image as it could be distorted in adapting to palette.
Turning on/off the button «Show original» we may compare original picture with adapted one according palette.

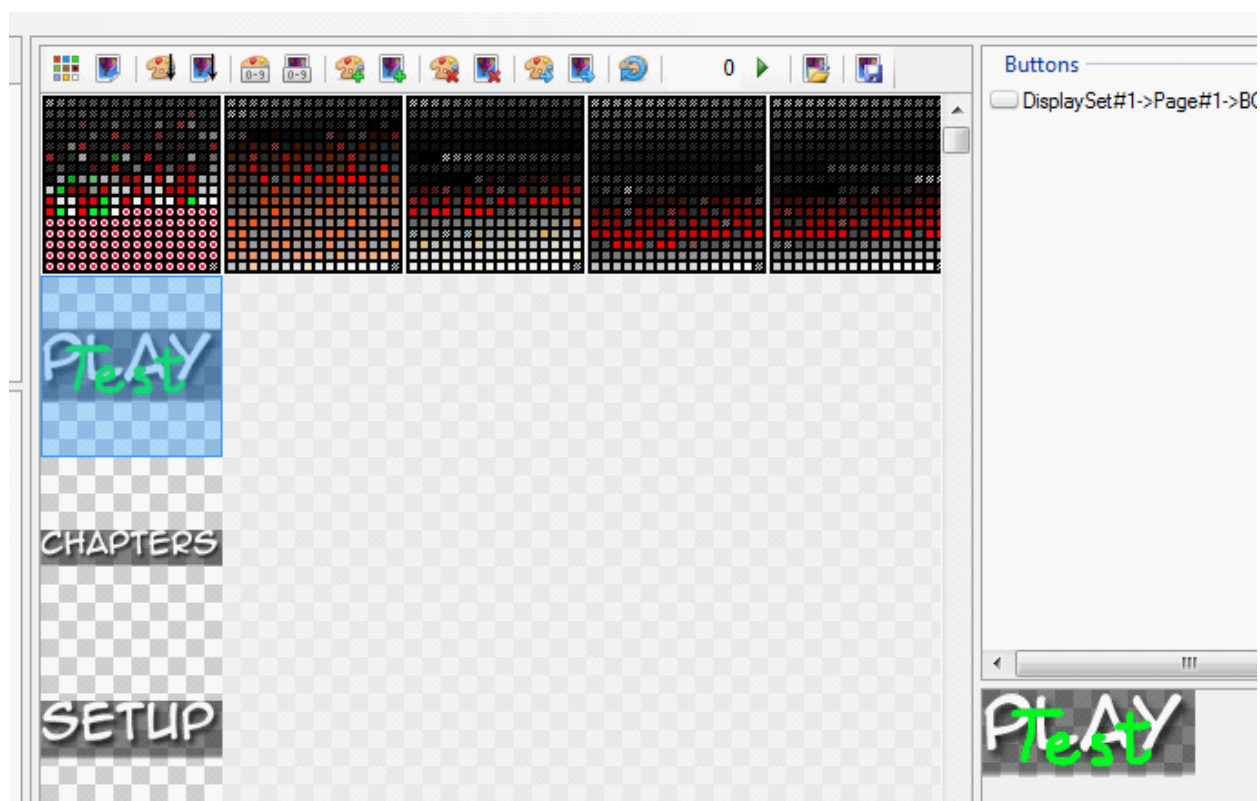


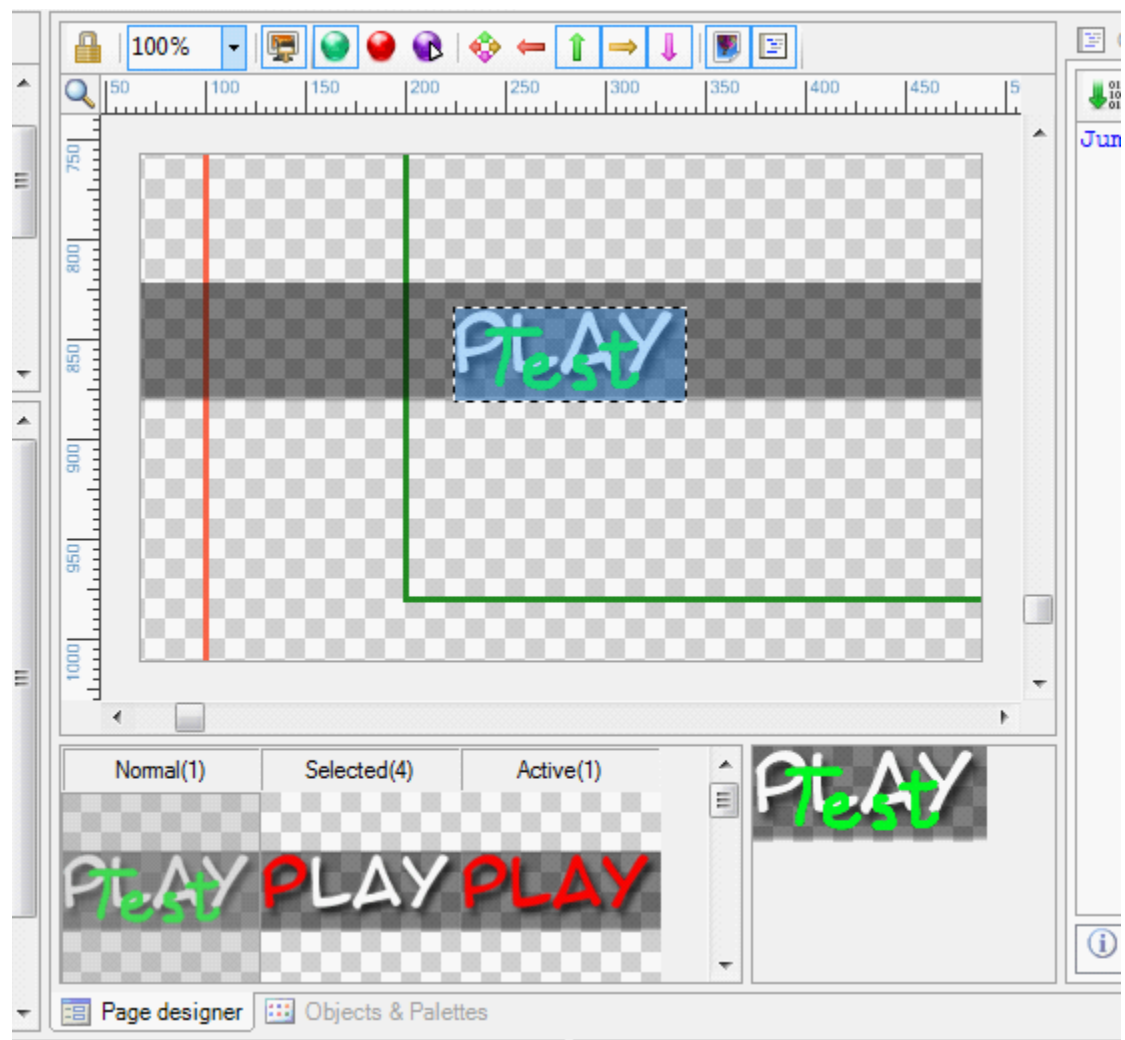


The example below illustrates how adapted picture have been distorted because of green color absence in palette, though it is used in picture. If adapted quality isn't right for us, we can recalculate palette with button «Recalculate Palette». But it should be remembered, such action can take long.



After recalculating palette we could see shade of green in it and our picture is much closer to original one.

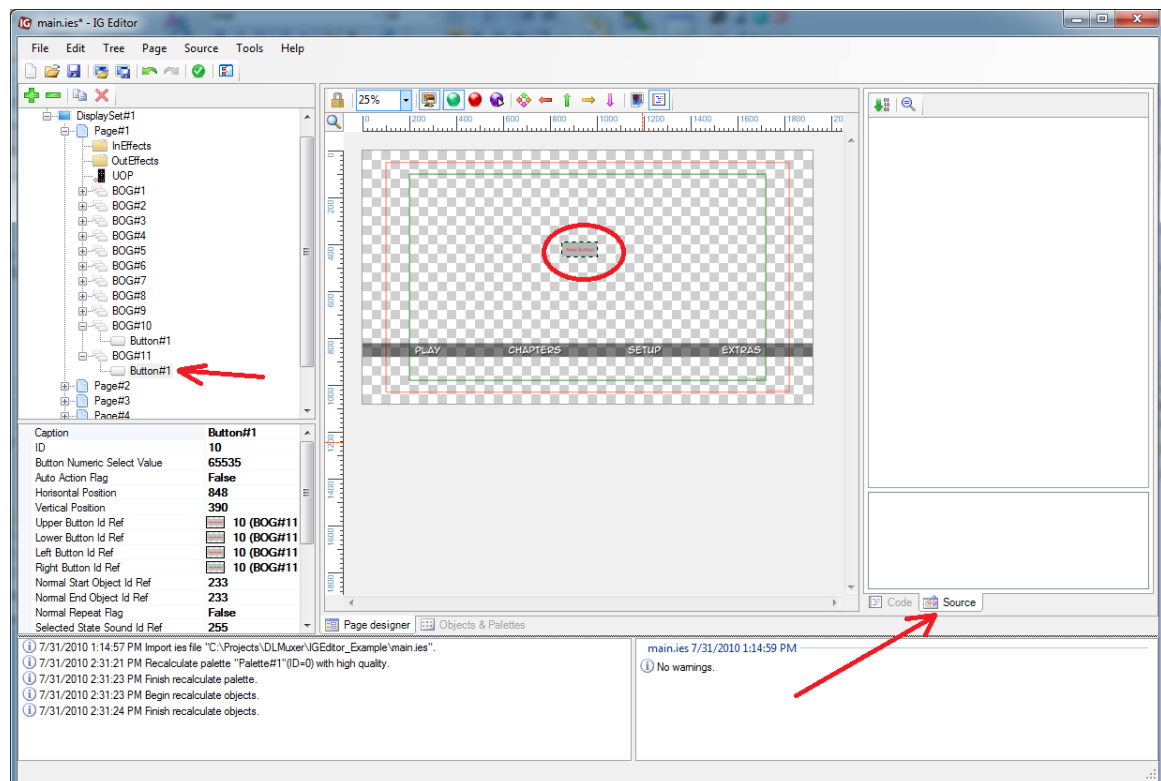




5.5 5. Add and change navigation commands

5. Add and change navigation commands

1. Select needed button in tree or "Page Designer". Go to "Source Panel". We can see navigation commands for selected button if they are present.



2. Write our command for execution after button clicked. If commands syntax are correct, we must see appropriate message in log. In another case, commands will not be assigned to current button.



3. After commands entering is finished we need to click toolbar button "Compilation" in order to finally assign the commands to the current button. We must see log message "Compiled successfully".



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